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APRIL 1911

STATE OWNERSHIP OF FORESTS
By AUSTIN F. HAWES

NEW IDEAS IN CONTROLLING FOREST FIRES
By SAMUEL J. RECORD

MICROSCOPIC WORK ON THE STRUCTURE OF WOOD
By H. D. TIEMANN

PROPOSED WISCONSIN LEGISLATION
By E. M. GRIFFITH

THE PRUNING OF WHITE PINE
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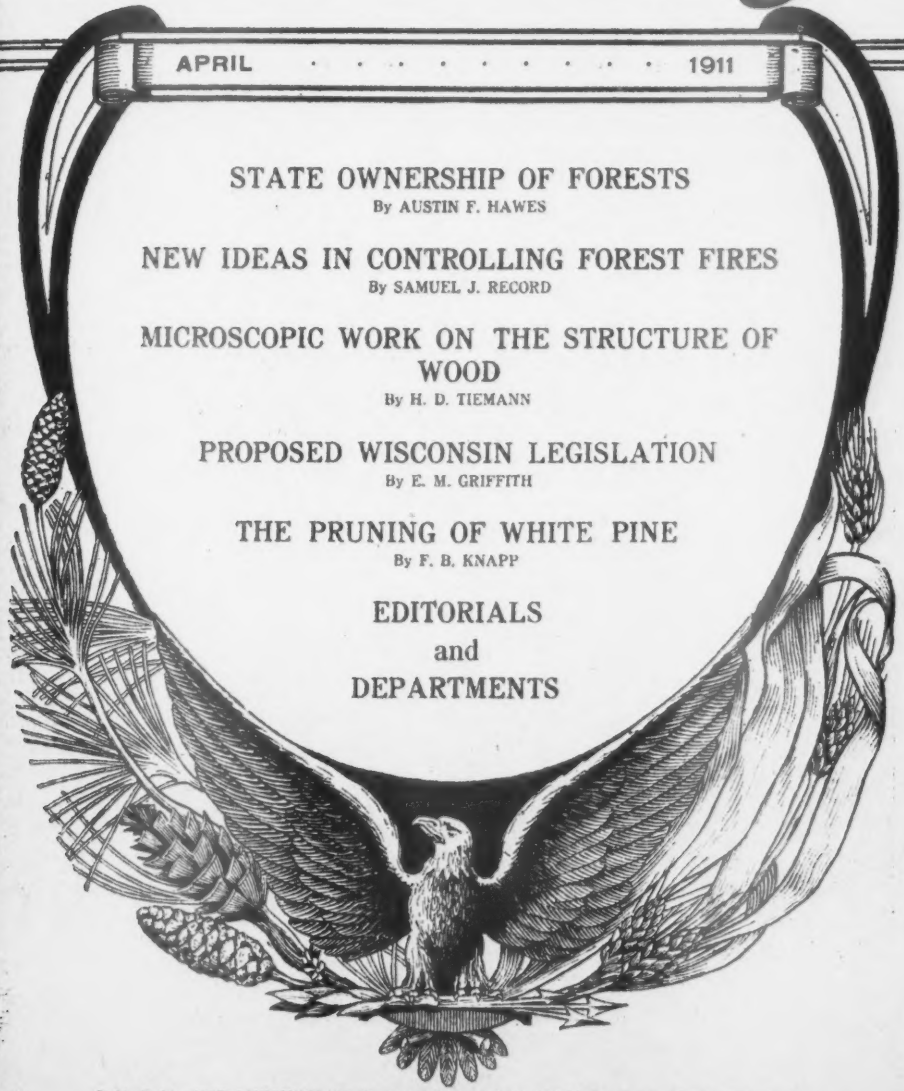
and
DEPARTMENTS



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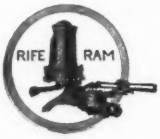

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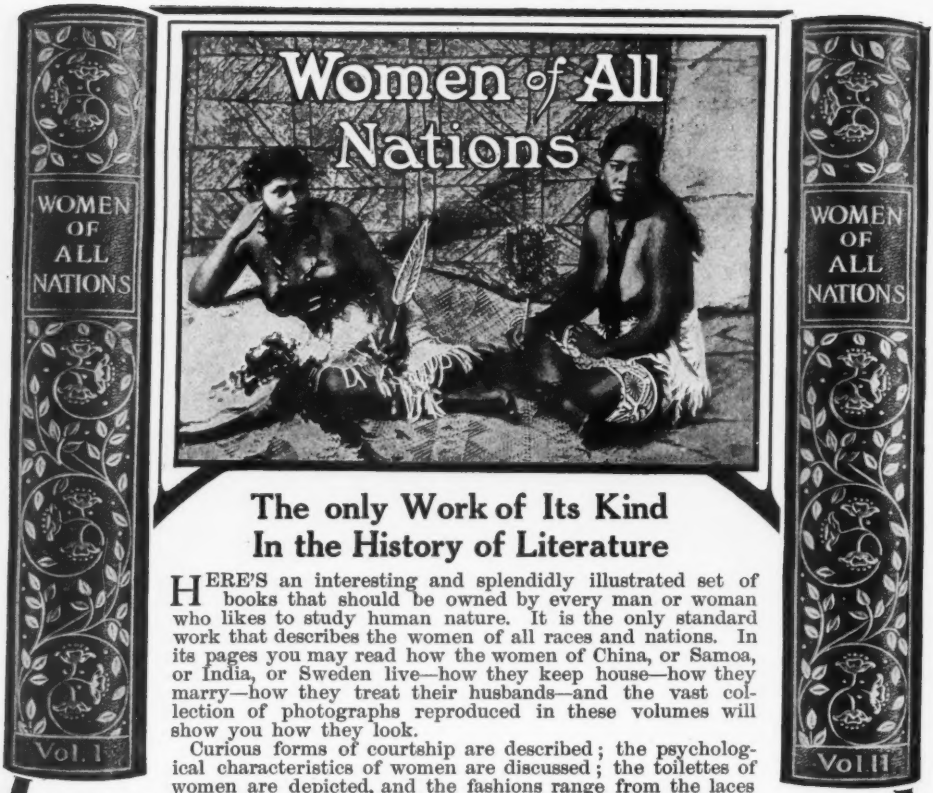

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Roosevelt

PLANTATION OF NORWAY SPRUCE IN VERMONT, THIRTY-TWO YEARS OLD.

American Forestry

VOL. XVII APRIL, 1911 No. 4

STATE OWNERSHIP OF FORESTS

By AUSTIN F. HAWES,
State Forester of Vermont.

(This survey of a most important branch of state forest policy was originally read at the annual meeting of the Society for the Protection of New Hampshire Forests in 1910. The author has been state forester of Connecticut, as well as of Vermont, and is thoroughly conversant with this question from the standpoint of eastern conditions. We have moved very slowly in the acquisition of state forests, but we must address ourselves to that side of forestry development in all the states, as Pennsylvania has notably done. The great forestry trilogy at present is fire protection, taxation, and state forests.—*Editor.*)

TWO periods in the history of the lands of this country will probably be recognized by future historians. First, the period when disposal of public lands was the only policy of state and nation; and, second, the period upon which we are now entering, distinguished by the policy of reservation or acquisition by state and nation.

The original states of the union upon the birth of the nation found themselves rich in lands with only a scant population to utilize them. It was natural that public debts, such as those due to soldiers, should be paid in land grants, that public bequests, as those founding Dartmouth, Bowdoin and the University of Vermont, should be in the form of land grants; and that the federal government should follow the policy of granting lands as a bonus to railroads building in pioneer regions.

Massachusetts, with its great domain of wild lands in what became Maine, disposed of great areas by lottery. By the Civil War most, if not all, of the lands in New England had been disposed of to private owners. In other parts of the country a similar course was followed, and the United States has now disposed of practically all of its agricultural lands.

Shortly after the centennial and the census of 1880, which first touched upon the forest resources of the country, there began to be an interest among far-sighted men in the preservation of the forests. As the best measure toward this end the bill was passed by Congress making national forests possible. This marked the beginning of the period of reservation and acquisition—a movement which has resulted in the creation of national forests amounting to nearly two hundred million acres and which has recently been broadened out to include other natural resources. It is naturally easier to secure from a legislative body the reservation for special purposes of lands already belonging to the public than the purchase of such lands. This is the

main reason that Congress has thus far neglected to provide a few million dollars for national forests in the east, while the government has been reserving hundreds of millions of dollars worth of land in the west for that purpose. While it is probable that this winter provision will be made for such national forests in the east, it is doubtful whether these will ever be on a scale of great importance to our states. Probably national forests in the east will always be intimately connected with the question of interstate commerce and the protection of the headwaters of navigable streams.

Fortunately, with the movement for the reservation of lands in the west by the government has grown up the idea of state ownership of forest lands through purchase. New York and Pennsylvania have now acquired immense areas partly for the purpose of water protection, partly for the preservation of the beautiful wild scenery and partly for the production of timber. Other states have started in a less ambitious way the same policy and it is already evident that the most striking feature of forestry development of the present century in the east, is to be the acquisition of large tracts by the various states, as reservation by the government has already been in the west. It seems to me that these state forests will fall into several different classes according to the reasons for founding them and the method of management which the purpose of their existence would dictate.

EDUCATIONAL OR DEMONSTRATION FORESTS

The first of these classes in importance for us in New England is the educational or demonstration forest. With the exception of northern Maine and certain mountainous regions of New Hampshire and Vermont, our forests are more or less cut up by agricultural lands and roads. We have easy transportation, either by water or rail, to the best markets of the country, which gives our stumpage a value exceeding that in any other region. We have valuable and rapid growing trees, such as the white pine, spruce, chestnut, etc. In fact, our natural forest conditions resemble more closely those of Europe than any other part of the country, and private forestry development can, therefore, be counted on if demonstrations of forestry operations are available such as state forests would furnish.

These demonstration forests need not be large but should represent one or two important types of land of the vicinity. Every such tract should contain some waste land suitable for planting as private owners can more easily be interested in planting than in any other branch of forestry. The experimental element may well be combined with the demonstration. Different species can be planted on different classes of soil. Mixtures and pure planting and various distances apart may be tried and thus a great deal of valuable data secured in a few years.

A local demand for forest seedlings can often be built up by the maintainance of a small nursery on the tract. But planting should by no means be the only line of work carried on. The demonstration forest should have a few hundred acres of woodland in which thinnings and improved methods of cuttings can be practiced so that land owners will see the various phases of forestry. Thinnings of different degrees can be practiced; the various silvical methods, such as the selection system, stand method, group and strip systems, can be developed so that in a few years the relative results will be apparent. Of course accurate accounts must be kept which can be published in bulletin form from time to time. In all these ways a tract of five hundred acres may serve as well as a larger one. It does not matter particularly whether it is immediately self supporting or not as it is primarily an educational establishment and not a money making scheme, but the sooner it becomes self supporting the sooner will it win the respect of the New England farmer and

lumberman. On some such tracts it will be advisable to give short courses in forestry dealing only with such lines of work as would be of use to the farmer. I can speak from personal experience of the efficiency of one such forest of 300 acres in Connecticut. In 1905 I purchased this tract in a portion of the state where forestry was scoffed at by everyone, and in 1906 started planting. In less than two years three thousand acres of private forests in the same township were under forest management and a nursery with a capacity of 100,000 trees was kept busy catering to the local demand. The sentiment of the whole county has been changed by this small beginning. We have at present two such state forests in Vermont, one of 450 acres in Plainfield near the center of the state, purchased at an average price of $4 an acre, and one of 350 acres given by Mr. Charles Downer, who has long been interested in forestry.

Not the smallest mission of these demonstration forests above described, is to educate the legislators so that they will forward laws in favor of forestry.

TIMBER RAISING AND REVENUE PRODUCING FORESTS

The kind of state forests advocated above are chiefly valuable indirectly for the influence that they have upon the people who will be led to practice forestry and pass favorable legislation. They will not be on a sufficiently large scale to bring in a revenue of any material value to the state except for supporting the forestry branch of the state government. European states have proved that forests can be maintained more profitably under state and communal ownership and the large areas thus owned pay a considerable share of the current expenses of the various governments.

Thus Saxony, which has very extensive state forests, derives an annual net income of $5.25 per acre from them. The Saxon forests are largely of spruce and pine and are chiefly managed under the method of clearing and planting, as distinct from the natural reproduction methods in use in Baden and the coniferous forests of France.

Prussia, as the largest German state, is interesting, especially from the fact that it is still purchasing waste lands for reforestation. The net income from its 7,300,000 acres increased from $1.53 to $2 per acre between 1900 and 1908; *i. e.*, net income of $14,600,000.

Wurtemberg and Baden are the two German states which produce the highest net results from their state forests. In Baden eighteen per cent of the state's wooded area or about 235,000 acres belongs to the state, and much of the remaining forest is under state supervision. The annual cut in the timber forest is now equivalent to about 500 board feet per acre. The revenues from these state forests come not only from the sale of wood but from hunting licenses, the sale of grass, berries and other products, while the expenses are for planting, road building, salaries, etc. In 1902 the net income from these forests was $5.08 an acre.

In Austria the state owns seven per cent of the total forested area and between 1874 and 1903 the net income from this 1,800,000 acres rose from $525,000 to $890,000. During this period over 85,000 acres were reforested.

Of the 6,464,000 acres in Bavaria the state owns about one-third. The total gross income from the 2,315,000 acres was $10,387,000, the expenditures, $4,593,000, leaving a net revenue of $5,894,000 or $2.54 per acre. Although there were 79 forest fires in 1905 not more than 240 acres were burned.

Similar figures might be given for the various other states of Europe showing that state ownership of forests not only pays, but that the revenue from these forests is steadily increasing, due to the ever improved condition of the forest. For the most part these forests have been crown or common lands since earliest history, but during the past century the areas have been considerably augmented by purchase.

In launching our New England states on a policy of state forests for timber raising and revenue, we are confronted from the first with the problem of purchasing the lands. In this connection it should be said that land in this section will probably never be as cheap again as it has been during recent years. In many sections the demand for this class of land is already improving and the price beginning to rise. On this account the sooner these lands are acquired the less the initial investment will be. The natural result of any extensive purchases on the part of the state will be to raise land values in the region. It will, therefore, be advisable from the standpoint of economy, to secure large areas gradually as money affords in a few localities, rather than to scatter small purchases all over the state, thereby raising values everywhere. Of course this raising of values is in itself a benefit to the state speaking in a broader sense. The individual owners are enriched, the assessable property of a town is increased, and the rate of taxation lowered.

What would be the probable investment for the state for the purchase of 100,000 acres, say, in New Hampshire or Vermont? This brings up a question of policy. Shall the state buy the cheapest land available or aim to get the best possible investment just as a private individual would? At first thought it might seem the state's duty to acquire cut over and burned over land of which there is such a great area in every state. It is a peculiar fact that the price at which most of this worthless land is held is usually from $1 to $4 an acre, while land of real value worth ten times as much can be purchased for $4 to $6 an acre. It is, therefore, a much better investment for the state as well as for the private purchaser to acquire this land covered with pine or spruce reproduction at these prices or sometimes even at $10 an acre, than to buy mountain tops from which the soil has been burned with the forest. Experience has convinced me that the committees of a legislature will be much more apt to approve this kind of an investment which appeals to the members personally than a purely altruistic proposition such as the acquiring of slash and burns.

There are in all of our New England states considerable areas of good timber still standing. In my opinion some of this class of land should be included, in the first place, because the people expect that the old forests are to be saved and will not be satisfied unless some scenic points are preserved; and, secondly, because by this means an income in the near future will be assured which will appeal to the business sense of the legislators and people. So in the purchase of 100,000 acres there should be a variety of classes of land divided something as follows:

50,000 acres waste land at $2.00 per acre	$100,000
30,000 acres, second growth, at $5.00 per acre	150,000
10,000 acres timberland at $10.00 per acre	100,000
10,000 acres good timber at $15.00	150,000
Total	$500,000

Something the same proportion would hold for larger purchases, *i. e.*, an average price for purchases made during the next decade of $5 an acre. Of course, in order to get lands at these figures, local agents would be employed and considerable diplomacy required in order not to inflate prices.

Two or three suggestions can be made for raising the funds to finance such a policy during a decade. The first and simplest is. of course, to appropriate from money in the state treasury $50,000 a year for the ten years. This is probably out of the question for either Vermont or New Hampshire at present, but then the results may be gradually accomplished by smaller appropriations. Another suggestion is a bond issue maturing in forty or fifty years when the forests become productive; and still another is to levy a special tax.

This might be a light income tax which falling only on private persons or corporations with incomes exceeding $5,000 would not be opposed by the mass of the people; or a small tax of, say 2 cents per thousand feet on all lumber manufactured. A tax of this nature applied only to concerns sawing half a million feet or over would not be heavy ($10 on 500,000 feet), and, as it is primarily for the ultimate benefit of lumbermen, should not be opposed by them. Many lumbermen would thereby be able to dispose of cut over lands which are now only a source of taxes. To be sure a tax of this amount would hardly afford $50,000 either in Vermont or New Hampshire, but it might supplement what the legislature was willing to spend from other sources.

It must be remembered that all this expenditure is in the form of an investment for the state; one which should bear good interest—it is safe to estimate from four per cent to six per cent.

The question in the management of these state tracts will come up as to whether it is best to manage them for the greatest possible profit (which would dictate a short rotation) or whether other features should be given importance. In my opinion a part of the area at least should be devoted to raising large dimension timber, such as those required for large telegraph poles, derrick sticks, bridge timbers, etc. This would require a longer rotation, probably 100-150 years, but the industries of the state would be greatly benefited by being able to rely upon a permanent supply of such materials. For similar reasons some slow growing trees, such as hickory and white oak should be fostered by the state in regions where they are adapted, even though they cannot be recommended for private planting.

PROTECTIVE FORESTS

In the above I have discussed state forests for educational purposes, for raising of timber and have not touched upon the protective use of forests. I believe this latter side is over emphasized and that forests are principally valuable for the raising of timber and the support of the industries dependent on them. Of course it is hardly possible to acquire 100,000 acres of forest anywhere in New England without its having a material effect upon the springs and brooks of the region. How much this would affect any large river is probably simply a question of the proportion of the forest area to the entire watershed of the river.

So, too, these forests acquired for these other reasons must add greatly to the beauty of the country and tend to make it a popular resort.

There are, however, in every state certain areas which should be acquired for protective purposes even if not from the standpoint of revenue. All steep mountain slopes in danger of being denuded should be owned by the state as clear cutting on such sites is disastrous to the soil and water supply held by it. So, too, there are areas of shifting sand which should be checked by forest planting that would not be profitable and is, therefore, a proper state duty.

In regions like northern New England and New York where scenery is such an important feature, many particularly beautiful forests should be saved from destruction by state acquisition. This is not sentiment on the part of the state but simply a matter of good far sighted policy.

In all these lines for which we have advocated state forests, it is to be noted that while the state will surely benefit from such a policy, the communities in which the forests are located will benefit still more. Many men will be employed in road building, forest planting, cutting and hauling and a population maintained larger than is at present found in many of these back regions. Local industries long since dead will be revived and maintained on a permanent supply of lumber not again to be abandoned as when forests

have been depleted in the past. All this prosperity in regions now nearly abandoned means happier homes and better citizens. This local effect reminds me of the advisability in some cases of establishing town forests like the communal forests of Europe which are of such great assistance to the small villages and the peasants who live in them. What could be a finer monument for a wealthy man to leave to his native town than a forest tract of five thousand acres to be managed under state control, the income to be used for town purposes?

WOODNOTES

II.

As sunbeams stream through liberal space,
And nothing jostle or displace,
So waved the pine-tree through my thought,
And fanned the dreams it never brought.

"Whether is better, the gift or the donor?
Come to me,"
Quoth the pine-tree,
"I am the giver of honor.
My garden is in the cloven rock,
And my manure the snow;
And drifting sand-heaps feed my stock,
In summer's scorching glow.
He is great who can live by me.
The rough and bearded forester
Is better than the lord;
God fills the scrip and canister,
Sin piles the loaded board.
The lord is the peasant that was,
The peasant the lord that shall be;
The lord is hay, the peasant grass,
One dry, and one the living tree.
Who liveth by the ragged pine
Founded a heroic line;
Who liveth in the palace hall
Waneth fast and spendeth all.
He goes to my savage haunts,
With his chariot and his care;
My twilight realm he disenchants,
And finds his prison there.

—Ralph Waldo Emerson.

SOME NEW IDEAS IN CONTROLLING FOREST FIRES

By SAMUEL J. RECORD

WHEN Daniel W. Adams last July became supervisor of the Arkansas National Forest the principal problem confronting him was that of protecting the forest from fire. The previous fire season had been particularly disastrous, due largely to incendiarism. The enforcement of laws pertaining to the disposal of the public lands and timber made many enemies for the Forest Service. It seems typical of a lawless mountaineer never to fight in the open and true to their instincts the enemies of the service fought from ambush. They burned the woods, they slashed and tore the posters and notices, they destroyed telephone lines, all with wanton disregard for the welfare of their law-abiding neighbors. The majority of the people in and near the national forests of Arkansas are opposed to forest fires and to all forms of lawlessness, but have hesitated to openly oppose such acts for fear of a criminal few. The unfortunate forest agitation at Washington was directly responsible for two-thirds of the fire damage on the Arkansas forests last season. The enemies of the service encouraged and incited by baseless charges and distorted rumors went to excesses that proved their own undoing.

When Mr. Adams assumed charge his main efforts were directed to a solution of the fire problem. First attention was devoted to organizing the better class of forest users in a fire protective association. In union these people have found the moral strength to oppose the lawless element and thus make woods burning unpopular. The dues of the association are devoted largely to establishing a fund to provide rewards for information leading to conviction of incendiaries. The value of the organization in reducing the fire danger through enlightened public sentiment has been fully demonstrated and will increase with growing membership. A disastrous fire season has taught the farmers an expensive lesson, that the incendiary menaces not only the forest but their property, their homes, their very lives as well.

Favorable public sentiment is essential but not in itself sufficient to eliminate the fire danger. Even under the best conditions fires will occur through accident or lightning or other uncontrollable source. Adequate protection requires (1) means of prompt discovery and location of fires; (2) ready access by trails and roads to all parts of the forest; (3) efficient means of fire fighting. Supervisor Adams, with years of practical training and with no small inventive genius, has been concentrating his attention on improvement of requirements (1) and (3). For months he has worked unceasingly, but good results are rewarding his industry and application. He has prepared a report describing his equipment, apparatus and protective devices. While some of his ideas may, at first blush, appear rather fanciful, they mark the most advanced step in the application of science to forest fire control.

Mr. Frank Rush, of the Wichita National Forest, has demonstrated the importance of water in fighting the hot prairie fires of his locality. He hauls the water in a tank to the scene of a fire and applies it by means of large sprinkling pots. In the mountains and rough forest lands water could not be hauled on a wagon, and there is usually a scarcity of water in the vicinity of

a fire making carrying by hand impracticable. A pack saddle device carrying two tanks of fifteen gallons capacity each and connected under a horse by hose attachments was tried out in the Ozark Mountains. The water was drawn from the tanks to knapsack sprinklers that fit over a man's shoulders.

From this device was evolved an arrangement for throwing the water direct from the saddle to the fire. This was first accomplished by means of a small air pump capable of a pressure of 25 pounds, later abandoned in favor of iron cylinders in which the air has been compressed to 2,400 pounds per square inch. This high pressure is reduced, by means of a simple valve, to a working pressure of from 10 to 25 pounds, and one cylinder is capable of exhausting the 30-gallon tanks 25 times with one charging. The entire apparaus is quite simple, the cost very reasonable, and the expense of operation almost nothing.

Mr. Adams' fire fighters look like warriors of old, for each carries a shield to protect him from the radiation and allow him to work close enough to put the water on the fire rather than on the flames. These shields are made of 20-gauge tin with asbestos cloth cover, and with a spiral wire hand-hold. A three by four-inch mica window is inserted near the top. The whole weighs two and a half pounds, costs only a trifle, and is in detachable sections which may be conveniently carried under the saddle stirrup leathers.

In the course of experiments it was early demonstrated that water in sufficient quantities was too hard to get and when used alone did not have the extinguishing qualities of certain chemicals, especially when used on very hot fires. No chemical apparatus on the market, however, had provision for refilling except by hand. Their use was further hampered by the fragile devices for mixing the acids and other chemicals. Mr. Adams overcame these objections and has applied for patent for a self-charging chemical equipment for shoulder support and an automatic charging equipment for pack saddle support. In this connection it may be interesting to note that the claims made by various chemical engine manufacturers that their engines throw a gas charged water whose fire quenching efficiency is forty to one over ordinary water, seems erroneous in that the water delivered by such apparatus is taken from below the gas line and not charged with gas at all.

Necessity for economizing the supply of water and using more of the flame stifling gas, either alone or in mixture with water, led to the invention of a valve and double hose arrangement whereby pure gas, pure water, or a mixture in any desired proportion can be obtained. By addition from time to time of small amounts of alkaline solution and sulphuric acid the entire charge can be re-energized with great economy of water.

But improvements did not stop there. To obtain a more intimate mixture of gas and water a special nozzle was perfected, which gave a rotary motion so great that the charge comes finely atomized to virtually a gaseous vapor. This should have especial merit in combatting fiercely burning forest fires.

To make the apparatus practicable on a large scale, several horses may be used in tandem. The leader carries the chemical engine while the rear horses tote the supply tanks containing the sodium solution. The tanks are connected by a common delivery hose coupled by lever valves similar to air hose couplings on cars. Such apparatus is designed for controlling the lee of back fires in dangerous places and fighting other fires in a high wind.

This idea of using several horses in tandem is an adaptation of the old principle of the "packer's hitch." In the mountainous mining regions it is customary to pack ore out and machinery in on mules or burros so hitched that the head of one is close to the tail of the next, making what is known as the "packer's head-and-tail hitch." In this manner the "jack whacker," as the man in charge is called, can lead fifty or more animals, and where the leader

USING EXTINGUISHER AND FIRE SHIELD

IDEAS IN FIRE CONTROL

OLD METHOD OF BEATING OUT FIRES

FIGHTING A SURFACE FIRE WITH A KNAPSACK SPRINKLER AND FIRE SHIELD

IDEAS IN FIRE CONTROL

CHEMICAL ENGINE ON HORSE
MR. ADAMS IN BUGGY

TESTING CHEMICAL ENGINE ON A BURNING TREE SNAG. THE INVENTOR, MR. ADAMS, IN FOREGROUND

FOREST OFFICER SIGNALLING TWENTY MILES BY HELIOGRAPH FROM RANGE FINDER STATION. NIGHT SIGNALS ARE MADE BY POWERFUL ACETYLENE LIGHTS WITH REFLECTOR

PACK SADDLE OUTFIT READY FOR QUICK MOUNTING ON HORSE

goes the pack must necessarily follow, since the animals are hitched so close in that they have no room to get behind trees or other obstructions.

An organized force of fire fighters and proper apparatus are not in themselves sufficient for adequate fire protection. For them to do effective work a fire must be located as soon as possible and there must be means of getting to it promptly. On the Arkansas National Forest fires are now located by means of range finding towers set on prominent peaks overlooking as much country as possible. The towers are connected by telephone with each other, and also with ranger stations and towns in some instances so that when a watchman sights a fire he can give warning or summon assistance.

The upper part of the watchman's tower is a sighting hood with a four-foot opening extending entirely around. In this opening are set, with mathematical exactness, 144 wires, each space corresponding to 2° 30′ of a circle whose exact center is marked by a plumb bob. When a fire is seen the watchman sights by the plumb bob to the wire in line, notes its number; then by telephone or signal exchanges this number with the corresponding number of another tower from which the fire is visible. A map with all the lines plotted is before him so that with any two numbers a fire may be definitely located. A hurried plan of action can be telephoned or signalled, since the map shows the roads, creeks, and fire lines. In planning to handle a fire, the velocity and prevailing direction of the wind, which are noted on a dial over the watchman's chair, are taken into account. Forest rangers, fire guards, and special employees without telephone facilities are notified by heliographic flashes by day and signal lanterns at night. This range finder is extremely simple in operation, designed especially for use by unskilled laborers, thus obviating the necessity for men skilled in the use of instruments who would command much higher salaries.

Supervisor Adams is of the opinion that the national forests could be better protected if the Forest Service had a special fire department separate from the general administration. He proposes "that a fire department of the Forest Service be organized, which should, with one notable exception, bear the same reaction to the service that the fire department of a city bears to the city government. The exception noted is that the members of the forest fire force should devote their extra time to designing and experimenting with equipment and apparatus, in field studies of local problems, and in laying out trails and fire lines. Supplementing this nucleus would be the regular forest officers, the rangers and guards, who would correspond to a volunteer force when the fire occurred."

Such reorganization of the Forest Service would largely relieve the technical men of that most unpleasant of all work, fire duty, leaving to them the solution of forestry problems for which they have specially trained. The men of the forest fire force, being freed from the multitudinous cares of administration, could devote their whole time to a study of fire problems and to effecting their solution. When one realizes that fire is the greatest of all impediments to forest conservation and the practice of forestry everywhere the importance of securing protection becomes obvious. Too much attention could hardly be given to the subject and no plans for the lessening of the danger should be denied a hearing and perhaps a trial. Whether or not Mr. Adams' plans prove successful he is at least entitled to credit for doing some original thinking.

THE PRUNING OF WHITE PINE

By F. B. KNAPP

Director of the Eric Forest School

THERE is a widespread theory among both American and German foresters that live branches must not be cut from evergreens. As the result of experiments by Mr. Nathaniel Morton, of Plymouth, Massachusetts, begun in 1891 and later investigations by the Eric Forest School, we hold exactly the reverse position with reference to white pine at least, and are convinced not only that such pruning can be successfully done but that it should form the basis for the treatment of our woodlands in many places.

Each system of silviculture has its distinct use and must make certain sacrifices to attain its ends. Our aim is to secure a fair quantity of large, clear, high-grade timber with a short rotation. To accomplish this we pay special attention to a small number of selected trees from the beginning. In the first stage of growth obtain by pruning and thinning a tall slender tree with clean bole of moderate length; then get a rapid diameter growth by keeping the remaining branches alive and enlarging the head to its full capacity.

Mr. Morton read a paper before the Massachusetts Forestry Association in 1899 telling what he had accomplished and describing his methods in detail. He found that the best time to prune the living branches of the white pine was in the hottest summer weather. The branch is cut off close to the bole of the tree; sap flows copiously at first but is quickly seared over by the heat, thereby sealing the wound against disease and preventing the streak of pitch so often found after winter trimming. The wound heals quickly by occlusion with no space or pitch pocket at the end of the small tight knot, and almost immediately outside of it the wood becomes clear and straight grained. As a fair sample of what we have found, the first piece of the Morton trees analyzed by us showed fifteen knots without a single one which failed to come up to this standard. Where a dead branch has to be taken off the cut is made deep enough to wound the living cambium entirely around the knot in order to produce the same quick recovery. For when a dead branch is broken or cut off without such wounding the growth is apt to continue for some years, much as though the branch were still there, forming a little tunnel to collect pitch and dirt.

During the first two years the proper amount of protection, light, air, and soil are maintained and a single leader secured for each selected tree and the neighbors are made subservient to it. When from four to eight feet high the pruning of live branches is begun, leaving the head about one-third of the height of the tree. This pruning of live branches and the protection from competitors is continued through the first period of growth. Not over two whorls are taken off in any year. At the end of this time we have a tree with a slender bole, no dead or sickly branches and a small but well developed head, closely surrounded though not crowded by more stocky trees. A typical tree with an eighteen-foot bole would be twenty-seven feet high with nine feet spread of crown, a diameter of four inches breast high and between two and three inches just below the first branch.

Now begins the second and final stage of growth. The trees have been chosen far enough apart so that they will not interfere with each other, no more pruning is done, the last small wounds heal quickly, and from that time on all the wood formed in the bole is clear. Through the ever increasing space occupied by the tree and the comparatively short stem, a good diameter growth is maintained to the end of the rotation and a large valuable log is obtained.

The Eric system of silviculture may be used in combination with several of the older forms, but the most promising treatment seems to be the three-story one. It may be applied in plantations, on areas where pine is mixed with coppice, and to especially good advantage on the many abandoned fields that are coming up by natural reproduction with a scattering growth of pine. The intermediate stages must vary with the condition of the tract when work is begun but a fully stocked woods ready for the final cutting of the upper story under a sixty-year rotation will consist of three ages—forty trees, sixty years old, ready to cut and occupying about eighty per cent of the space; forty moderate sized trees; and a greater number of small ones, the selected forty of which are just completing their first period of growth and require an insignificant amount of space. The nurse trees which have been retained increase the crown cover and prevent the stand from becoming too open underneath. The spring after cutting the upper story a dozen or more transplants are set out in each opening, and in twenty years another crop is ready to harvest.

Artificial pruning is a distinctive feature of the system and may be applied to many species. All foresters agree that most of our hard woods can be trimmed, when branches are small, without injury and to the great improvement of the quality of the lumber, and experiments by Professor Mer of Nancy, France, indicate that spruce can be added to the list.

I hope that investigators who see this article will send to AMERICAN FORESTRY or write to me, no matter whether in approval or condemnation, showing the results of their experiments; and I am particularly anxious that they should try Mr. Morton's method of pruning. Some of my German friends are going to experiment along these lines when the proper season comes around.

We have not done enough work as yet to be able to give accurate figures of cost and growth or to state closely where the line is drawn between the conditions of the tract and location in which such work would bring good financial returns and those where the growth is so slow that compound interest and risk would make the investment unwise at our present prices.

It is very important that different silvical systems suited to our varied conditions should be applied on a large scale, and as rapidly as practicable to transform our forest and waste lands in such a way as to give a sustained crop and additional wealth to the community. One of these should be either the plan outlined in this paper, as modified by further experience, or some other, producing the much needed clear lumber in a reasonable time.

MICROSCOPIC WORK ON THE STRUCTURE OF WOOD

By H. D. TIEMANN,
In Charge Section of Timber Physics, Forest Products Laboratory

IT IS remarkable that, in the present age of development of practical uses from scientific knowledge, there should still remain a field of very common and wide interest undeveloped in a practical manner. In the knowledge of the relationship of wood-structure to its physical properties and uses nothing appears to have been worked out in a complete and concise form such as to be of use to the busy man. This field of investigation might be better spoken of as an adjoining frontier, since it is the common ground upon which the technological knowledge of the properties and uses of woods, and the scientific study of the growth and anatomy of the wood substance from the botanical standpoint join together. In both of these separate fields an enormous amount of study has been carried on, and a great deal of knowledge exists, and there has been a number of very extensive works published in an attempt to cover the entire subject. Almost without exception, however, where the treatise is so broad in its scope, this frontier of knowledge has been narrowed down to a line or largely obscured. Such works, however, are beyond the use of the busy man because of their very comprehensiveness. As a rule it is the botanist who is most familiar with the anatomy or histology of wood structure, while he knows but little of the processes of manufacture of wood or of its use in framed structures. On the other hand, the manufacturer, carpenter and engineer know little or nothing about the microscopic make-up of the very material with which they are working and which they have been handling most of their lives. Why is white oak more lasting and better wearing than red oak, and why is the former suitable for light cooperage while the latter is not? Why are firs so difficult to treat with preservatives and pines so easy? Why is eucalyptus so difficult to dry? Ask questions like these of the artisan or engineer and what, as a rule, can he reply? Yet the answers are simple and can be clearly shown in a way to be at once comprehensible to the business man without scientific training.

As a rule, in works discussing the properties of woods where the microscopic structure is shown, it is done from the standpoint of the identification of species, and little or nothing is said in regard to the correlation of structure with properties and uses.

While it is fully realized that many of the properties of wood cannot be predicted nor explained from a microscopic examination of structure alone, yet it is believed that much information of value would result from a systematic study of this kind. Already the importance and effect of thoroughly drying wood for preservative treatment and the effect of steaming have been demonstrated by a study of this kind, made at the Yale laboratory of the Forest Service,* and the reason why white oak is suitable where red oak is

*In Bulletin 107 and 120 of the American Railway Engineering and Maintenance of Way Association 1909 and 1910, on the "Physical Structure of Wood in Relation to its Penetrability," by H. D. Tiemann.

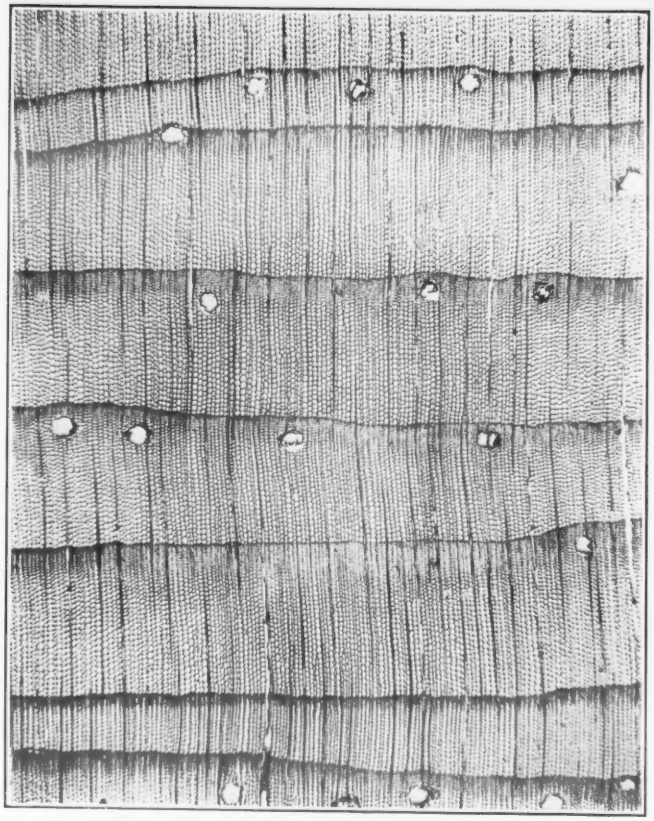


FIG. 1. CROSS SECTION SHOWING SEVERAL ANNUAL RINGS AND A NUMBER OF RESIN DUCTS

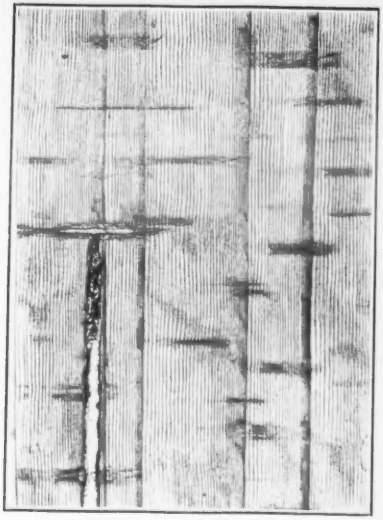


FIG. 2. RADIAL SECTION THROUGH SEVERAL ANNUAL RINGS, SHOWING A RESIN DUCT WITH TYLOSES. THE BORDERED PITS ARE VISIBLE ON THE WALLS OF THE TRACHEIDS

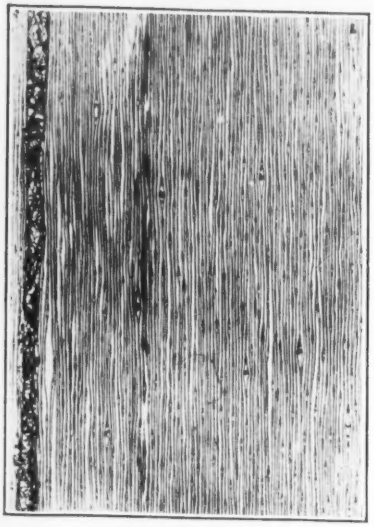


FIG. 3. TANGENTIAL SECTION SHOWING A VERTICAL RESIN DUCT FILLED WITH TYLOSES AND CROSS SECTIONS OF SEVERAL HORIZONTAL RESIN DUCTS IN THE MEDULLARY RAYS

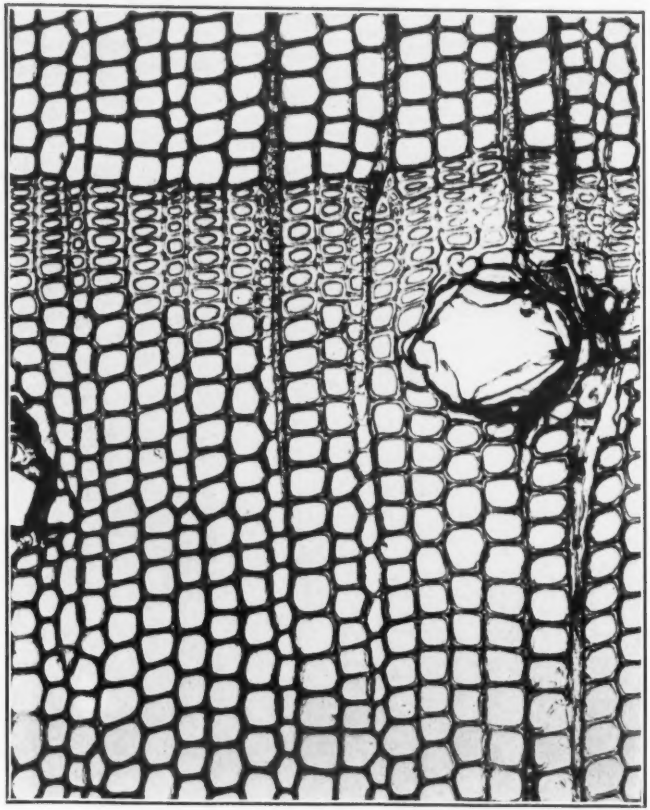


FIG. 4. CROSS SECTION AT JUNCTION OF ANNUAL RINGS, MAGNIFIED 300 TIMES. TWO RESIN DUCTS ARE VISIBLE

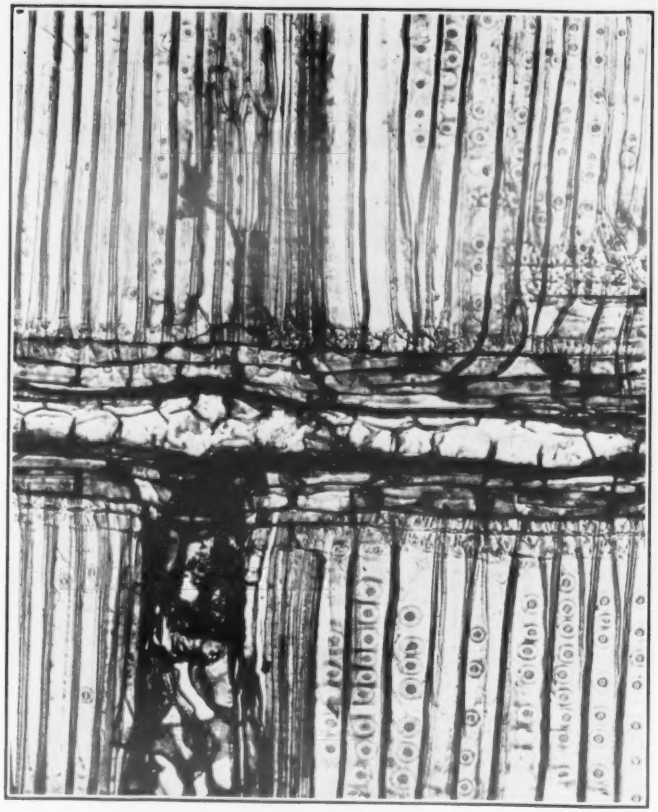


FIG. 5. RADIAL SECTION MAGNIFIED 300 TIMES. A MEDULLARY RAY CONTAINING A HORIZONTAL RESIN DUCT IS SHOWN AND THE UNION OF THIS WITH A VERTICAL RESIN DUCT. THE DUCTS ARE FILLED WITH TYLOSES FROM THE ENCLOSING EPITHELIAL CELLS. BORDERED PITS ARE ALSO VISIBLE

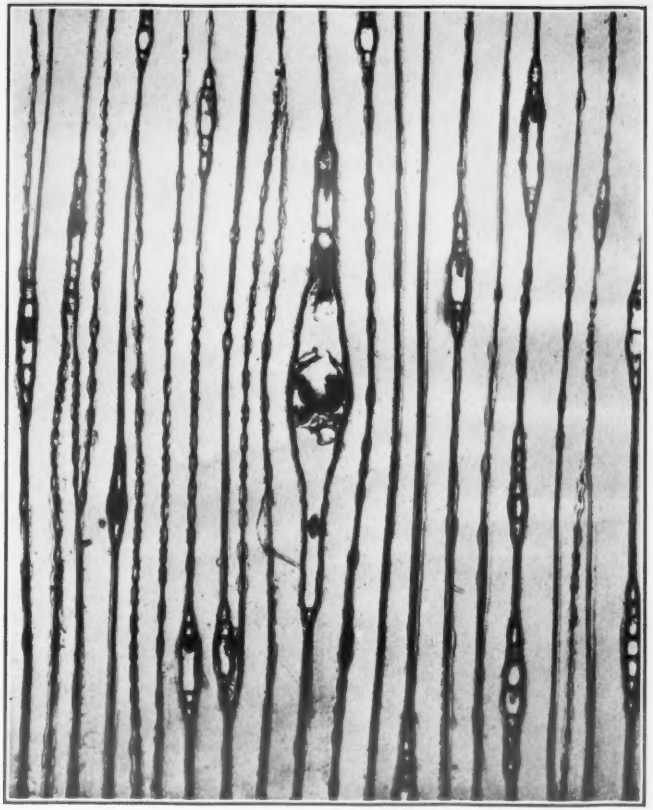


FIG. 6. TANGENTIAL SECTION MAGNIFIED 300 TIMES. A MEDULLARY RAY CONTAINING LARGE RESIN DUCT IS SHOWN IN THE CENTER OF THE FIELD. BORDERED PITS APPEAR IN SECTION, LIKE LINKS OF CHAIN ON THE WALLS. THE TORUS IS VISIBLE IN MANY OF THE PITS

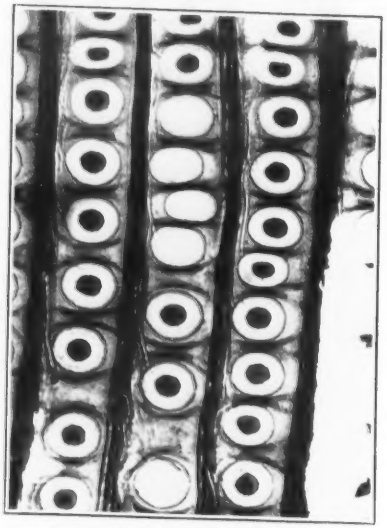


FIG. 7. RADIAL SECTION MAGNIFIED 800 TIMES SHOWING BORDERED PITS. THE TORUS IS VISIBLE IN MANY OF THESE, APPEARING AS A BLACK OVAL DISK IN CENTER OF PIT

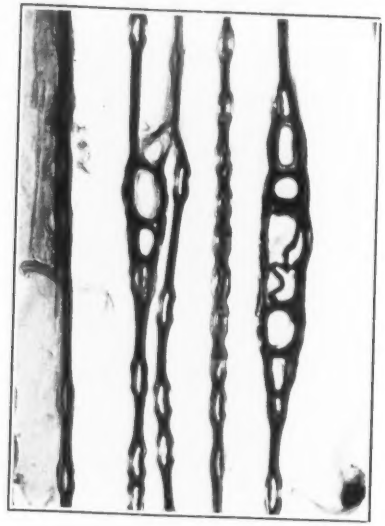


FIG. 8. TANGENTIAL SECTION MAGNIFIED 800 TIMES, SHOWING BORDERED PITS IN SECTION. THE TORUS IS SHOWN IN MANY CASES PUSHED UP AND SEALING THE OPENING

not has been clearly shown. A careful study of the structure of several woods and the changes which are produced in drying and under mechanical stresses was made at Yale laboratory by Mr. W. D. Brush under the writer's direction. A statement of his results, fully illustrated by excellent photomicrographs and drawings, appears in an unpublished Forest Service report.

The Service has planned a comprehensive line of work of this kind which is now under way at the new Madison Laboratory. (Other microscopic work on the histology of wood, but from the botanical standpoint, with a view to the identification of species, is also being carried on in Washington in the section of Dendrology.) The principal purpose of this work is to bring the two fields of knowledge mentioned before into relationship by making clear to the artisan, engineer or user of wood, the (microscopic) anatomical structure and differences in structure of various woods which underlie the physical and mechanical properties, and differences, in the material he is using and with which he is already familiar. New uses and reasons for not using various woods will also naturally be suggested.

To exhibit these facts, chief reliance will be placed upon photomicrographs of the wood sections and elements themselves. These will be arranged in a systematic and logical manner and will be shown at uniform magnifications so that the micrographs of all the different species will be directly comparable. The views will be supplemented by such descriptions and discussions as will lend clearness to the subject. This discussion will be in non-technical language so as to be intelligible to the persons for whom it should be chiefly valuable.

It is believed that this proposed publication will be unique in this respect. Among all the works covering these fields, nothing has been found with this specific purpose in view, and giving illustrations in a comprehensive manner and of uniform style. It is our purpose, as far as possible, to make the illustrations speak for themselves, which will be in a universal language not requiring translation.

The equipment of the laboratory for this research is very complete. As a foundation, a collection of important commercial woods is being made. The specimens consist of short logs from normal commercial trees, the sylvical conditions of the place of growth of each specimen being recorded. From these specimens small pencils are cut while green and preserved in paraffin or formalin without being allowed to dry out. The pencils are taken at a point about four feet above the root swelling and run from bark to center. Thus a representative piece is obtained for the microscopic sections. In many cases another piece is taken from the top of the same tree. Thus far about one hundred species have been obtained.

The first part of the work consists in the preparation of a complete collection of permanent microscopic slides. The small pencils cut from the wood specimens are treated in the usual manner for preparing microscopic slides, sectioned on a special microtome, stained and mounted in balsam. As a rule three samples are taken from each pencil, one from the sap wood, one from the main portion of the heartwood, and another from near the center of the tree. From these samples sections are made in three planes; transverse, radial and tangential.

The microscopic slides thus completed would be of little use to the public for the purpose intended without the next step, namely, the photomicrographs. A complete equipment for this work is installed at the laboratory, including a dark room and all accessories. The apparatus for making the photographs consists essentially of an arc light, a system of condensing lenses, ray filters for obtaining monochromatic light, microscope and lenses, shutter, camera

bellows and plate holders. In the apparatus here used, which is a Bausch & Lomb "Balopticon" and Zeiss microscope, the parts are mounted horizontally in the order mentioned. The heavy iron bases supporting the several parts are placed on rubber cushions under the feet as a precaution against vibrations, as a very minute vibration of the microscope is greatly magnified upon the screen. Non-halation orthochromatic plates have been found to give the best results, although ordinary plates may be used with fair success. The process of taking the photographs through the microscope does not differ materially from that of taking an ordinary picture with a camera by use of a color screen or ray filter. The art of making these micrographs consists largely in obtaining a uniform illumination of the field and the proper focus. To focus properly requires experience, as it is not possible to show on the screen exactly what one sees through the microscope with the eye, since in the latter case a slight adjustment is made by the eye, whereas in the camera the focus is dead and in one plane only. The effect of perspective is lost in the camera. Of course the result in every case is absolutely dependent upon the slide, which, for the best results, must be of the proper thinness, correctly and uniformly stained, absolutely flat, clean and free from air bubbles. It must also be of sufficient size to cover the field desired.

To illustrate the wood structure, two or more magnifications will be used, a low power of perhaps 30 or 50 diameters to show the general appearance, and a higher power of perhaps 300 diameters to show the minute structure in detail. Higher magnifications also will be used when it is desired to show remarkable features such as bordered pits, for instance.

The largest views taken will be eight by ten inches, which can be subsequently reduced to any size for publication. The accompanying photographs are given as illustrations of the views to be shown, and are made from sections of Bull Pine (Pinus ponderosa). Figures 1 to 3 are magnified thirty times; 4 to 6, three hundred times; and 7 and 8, eight hundred times. Similar views to these are to be made of the various important species so far as any visible distinctions can be shown, and an attempt made to show, as far as possible, the interpretation of these features or distinctions in the outward properties, and distinctions in properties, of the various woods In some instances it is contemplated to show in addition to the sections the individual separated elements.

The work is being done by the section of timber physics, and is in the hands of experts in this line. Miss Eloise Gerry, who is making the sections and slides, comes to us from Dr. Jeffrey of Harvard, and Mr. Simon Kirsch, who is making the photomicrographs and has general oversight of the work, is from the late Dr. Penhallow of McGill University.

It is not our belief that a study of this kind will ever fully explain the differences in the mechanical and physical properties of different woods, nor can it be hoped to offer a means of predicting with completeness how a new or unknown wood will behave. Such points must be determined chiefly, as heretofore, by direct actual tests of the properties in question. Even were this prediction possible, it is very doubtful whether it would serve any practical use, since ordinarily it would be easier and simpler to make the direct test than to cut, prepare and examine the sections under the microscope. However, while it may never be possible to completely predict the properties, certain uses and behavior of the species under given conditions will most likely be indicated and suggested and much clarity and light will be thrown on the causes of the behavior of the various woods under certain conditions and treatments. It has been the experience of the past that wherever knowledge of fundamental truths has been brought to light, important results have fol-

lowed. It is impossible to foretell explicitly the benefits which may arise from a clearing away of the clouds hanging over this adjoining border land of knowledge, but it is reasonably certain that benefits will result fully commensurate with the expense of the task.

BIBLIOGRAPHY

The following are some of the most important works referred to, in which the entire subject in the two fields of knowledge is more or less covered.

One of the earliest comprehensive works of this kind, and still a standard in many ways, is that of Dr. H. Nördlinger, published in 1860, "Die Technischen Eigenschaften der Hölzer, für Forst und Baubeamte, Technologen und Gewerbtreibende." (The Technical Properties of Timber for Forest and Civil Engineers, Technologists and Manufacturers.) For the mechanical properties Nördlinger relied largely upon the previous work of Chevandier and Wertheim. He added a description of the anatomical structure of the various species of wood with a view to explaining many of their properties from the anatomy. He treated also upon their chemical and physical properties, including durability and defects. A more recent publication by the same author appeared in 1890: "Die Gewerblichen Eigenschaften der Hölzer." (The Industrial Properties of Timber.)

Another work, in French, *"Le Bois,"* was published by J. Beauverie in 1905. In this work, which covers 1,400 pages, the attempt at extreme comprehensiveness is made. Every phase of the subject of wood is gone into, from a botanical description of the trees to the manufactured products. Much space is also given to insect and fungus enemies of the trees, and a description of the forests of the world is given. A table is added grouping the woods by their anatomical structure and giving the uses. The work is really an encyclopedia and is almost too comprehensive to be authoritative in any one line.

"Die Forstbenutzung" (Forest Utilization), by Karl Gayer and Heinrich Mayr was published in 1909 as a tenth edition. It contains 630 pages and also covers a very wide range from the growth of the timber in the forest to its ultimate use, including all by-products, even the soil.

The works of Theodore and of Robert Hartig should be mentioned in this connection, and also Lorey's "Handbuch der Forstwissenschaft," published in 1887 in three volumes, and recently a second edition in four volumes.

In the way of descriptive material, the collection of actual wood sections made by Dr. Nördlinger and published 1852-1860, "Querschnitte von 100 Holzarten" is worthy of record, and more recently, the similar and larger work on "American Woods" by R. B. Hough.

In English not very much of an extensive nature has appeared in this line. One of the best works is by Boulger, entitled "Wood," of which the 2nd edition was published in 1908. In this book a number of photomicrographs are given of wood sections. "Timber and Timber Trees," by Laslett, 1894, touches upon the structure as an introduction to a description of the mechanical properties of commercial woods. Herbert Stone, in his "Timbers of Commerce and their Identification" (1905), goes so far as to show a slightly magnified photograph of each species described. A publication by J. R. Baterden, in 1908, entitled "Timber," gives a brief description of many commercial woods but very little on the anatomy.

One of the best publications in English, discussing the structure of wood and its relation to its properties, is Forest Service Bulletin No. 10 by Filibert Roth on "Timber," published in 1895. Bulletin 13, "The Southern Pines," by Mohr and Roth, and Bulletin 22, "The White Pine," by Spaulding and Fernow, are also of value from this point of view.

There are also other publications touching more or less upon this subject, but the above is intended only as a brief review of some of the best works.

As stated in the beginning, there is a vast amount of literature covering the anatomy of woods, and also their mechanical and technical properties and uses, but only such works as touch upon the relation of the two fields of knowledge have been cited in this review.

THE FOREST AND THE FARM

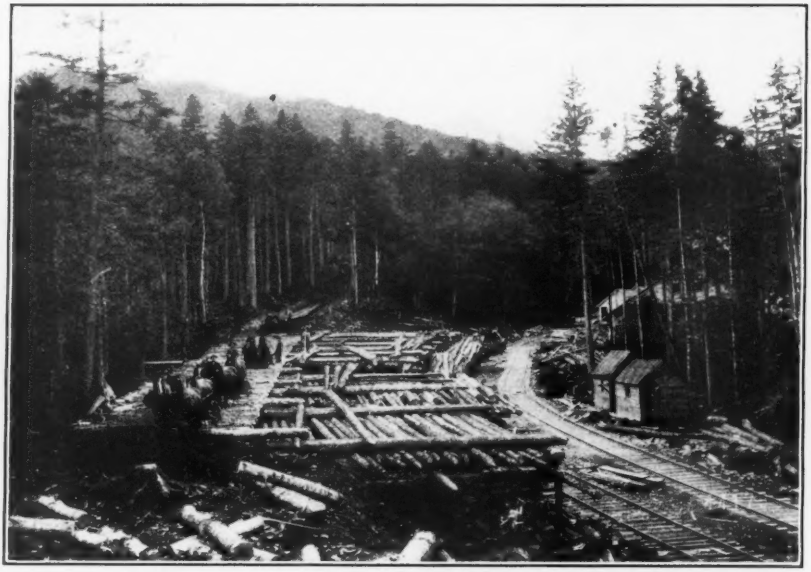
LIBERTY H. BAILEY, the dean of the New York State College of Agriculture, delivered an address at the University Club in Buffalo, on the country life movement in America, which, if we may judge from the newspaper reports, was full of the wisdom we always expect from him. Mr. Bailey admitted that present conditions in the country were bad, but he declared that these conditions would soon be of the past. Before many years co-operative farming, new methods, new social customs, new relations with the city, would have worked out a complete change in the business of farming and the lot of the individual dwellers on the land.

But the point of especial interest to us was his plan for utilization of abandoned farm lands, those that have passed out of profitable use forever on account of changed conditions. "Yet," he declared, "they are not useless. It simply does not pay to handle them and they should be put to their destined use." He noted the development of wheat and corn growing on a large scale in the west, leaving truck farming to the east, and that is profitable only near large cities or good transportation. Then he said, as reported, "I am strongly in favor of a system of some sort of county ownership or state ownership. Let the community buy these abandoned lands as it could very cheaply. Let it reforest them. Most of the hill-tops in the Adirondack region and the center of the state could most profitably be converted to that use. Others could be used for raising live stock, others again to raising apples for export. Individual ownership should not be allowed to drop in applying these methods. It could go on and afford good livings to many farmers. But the state should no longer allow those lands to go to waste for want of a little enterprise and co-operation."

There was much more, but in this suggestion of community ownership and reforestation we believe lies the solution of much of the abandoned and waste land problem of our densely populated eastern states. Even in such a populous state as Massachusetts more than half the land can only be profitably used to grow trees. In part they may be orchard trees, for wonderful fruit can be raised on some of these discouraging looking New England hillsides. But on the larger part of this acreage forest trees must be the solution. The future welfare of these states demands that this plan be adopted and soon. Already many of our eastern farmers are learning that their woodlots are not by any means the least of their possessions. Perhaps by and by our towns, counties and states will learn to follow the example of the thrifty communities of Europe and turn their waste lands into bank accounts for the people.

FRANCONIA NOTCH FROM NORTH WOODSTOCK, NEW HAMPSHIRE

TYPICAL WHITE MOUNTAIN FOREST CONDITIONS



SKIDWAY WITH FOUR-HORSE TEAMS UNLOADING, SCALER SCALING LOGS, AND THREE LOADED CARS ON TRACK; NEW CAMP ON RIGHT. LINCOLN, N. H.

GRADED LOGGING ROAD; GRADING COST $16 PER MILE. FOUNDATION FOR TRESTLE IN FOREGROUND. NEW EXTENSION OF LOGGING RAILROAD THROUGH FRANCONIA, N. H.

TYPICAL WHITE MOUNTAIN FOREST CONDITIONS

NEAR SUMMIT OF MT. ECHO, WHITE MOUNTAINS. FIRE CONSUMED THE SOIL TWENTY-THREE YEARS AGO AND LEFT IT PERMANENTLY BARREN

MT. WEBSTER, WHITE MOUNTAINS, MADE PERMANENTLY BARREN BY FIRE AND EROSION FOLLOWING THE AXE. THIS IS WHY WE WANT PROTECTIVE FORESTS ON STEEP UPPER SLOPES

TYPICAL WHITE MOUNTAIN FOREST CONDITIONS

MT. ADAMS, WHITE MOUNTAINS, SHOWING HOW FIRE RAN OVER DURAND RIDGE AND BURNED THE SCRUB

TYPICAL WHITE MOUNTAIN FOREST CONDITIONS

FOREST PROTECTIVE LEGISLATION PROPOSED BY WISCONSIN

By E. M. GRIFFITH

State Forester of Wisconsin.

(An address delivered at the Lake States Fire Conference, December 4.)

ALL thinking people realize that the wonderful forest wealth of this country cannot be conserved through wise use until the government, the states and the private owners are willing to spend the large sums which will be necessary to stop the annual and appalling loss from forest fires. This country is growing out of its irresponsible boyhood days, with its reckless waste and utter disregard for the future, and as it has grown older, and as elbow begins to rub elbow with the enormous increase in population, we are beginning to learn a truth long known in older countries, that the state in order to do its duty to all its citizens must use its general police powers much more freely than in the past, and that the selfish interest of the individual must give way to the infinitely greater good of the whole people.

This academic introduction is merely to prepare your minds for the extensive fire protection system which we hope will be adopted by the state of Wisconsin; which will cost a very large sum and will oblige the state to exercise its police powers, so as to protect not only its own timberlands, but those of all its citizens as well.

The United States census for 1900 gave Wisconsin the proud position of ranking first among all the states in the production of lumber. The census of 1910 will show that Wisconsin has fallen back in these ten years to eighth place, and that her production of lumber in the same period of time has decreased forty per cent, which is more than that of any other state. The wood using industries of the state, not counting the saw mills, use annually over 930 million board feet of lumber, valued at $20,000,000, but the state will lose these industries, and many others even more important, as saw mills, paper and pulp mills, etc., unless all forms of needless waste are stopped, and certainly forest fires are the most useless and needless forms of forest waste.

The Lake States Forest Fire Conference proves that the severe fire losses of 1910, following the even greater losses of 1908, have aroused us all as never before, and if our legislators can truly appreciate the situation, I am sure they will not fail to act. Let us see what the fire losses have been in Wisconsin. In 1908, according to the reports of our fire wardens, 1,200,000 acres were burned over, and the loss in timber and young growth amounted to $9,000,000. For 1910 our reports are still incomplete, but those received indicate that at least 1,000,000 acres have been burned over, and that the financial loss will amount to several million dollars. The direct loss of merchantable timber, however, is not by any means the most serious in its lasting results, but rather the loss of the industries which depend upon the forests for their raw material, and the still greater ultimate loss through the destruction of young, growing timber, upon thousands of acres which are burned over every year.

Wisconsin has a wealth of fertile land awaiting cultivation, but she also has large areas more valuable for forest growth, and the people of our state do not as yet begin to appreciate the great future value of the young timber upon such lands, and the careful protection which such small timber needs. Mature merchantable timber which is burned can often be cut and so saved, but young timber when burned is almost always a total loss.

At present Wisconsin has the following system of town fire wardens: The state forester is authorized to appoint as many fire wardens in each organized town in the state as he deems necessary, and we now have over 500 fire wardens in the northern or forest portion of the state. These fire wardens post notices, have authority to call upon any person to assist them in fighting fire, are given the same authority as sheriffs to arrest without a warrant, and when in their judgment a dangerously dry time exists, and it is unsafe to set fire for clearing land, or for any other purpose, they have the authority to post special warning notices, forbidding the setting of any fires. The fire wardens and the men called out by them, are paid by the town boards for the time which they actually serve at a rate not exceeding 25 cents per hour, but the total amount which can be expended annually is limited to $100 per township, or 36 sections. It will be noted that the fire wardens have a considerable amount of authority, and as the best available men, irrespective of politics, have been appointed, they have put out thousands of small fires and thus averted much heavier losses, but the whole system is faulty from the fact that it is based upon the plan of putting out fires after they occur, while it is now becoming a well known truth that the greatest efforts in forest protection should be centered upon fire prevention.

It must have been an old forest fire fighter who coined the expression "An ounce of prevention is worth a pound of cure," and probably he had seen as we nearly all have, a small neglected blaze fanned and spread by the winds until it became a fire of such proportions that men were powerless before it.

The present limit of expense in fighting fire of $100 per township is absolutely inadequate in very dry years, such as 1908 and 1910, and in such times when the wardens are needed the most is no time to have the financial cog of the system break down.

Theoretically, the plan of allowing fires to be set at any time, except when the local fire warden posts notices forbidding any fires, is correct, for it imposes the least possible interference with individual rights and especially the clearing of forest lands by settlers in order to make farms, which is of course so necessary, provided it is done at the proper time, and in the proper manner, so as to avoid the wide destruction of the past. Such enormous damage has been done in Wisconsin for the last six years, through fires set by settlers in clearing land, and it is so difficult to secure convictions as the settler can merely claim that he did not see the special warning notices forbidding the setting of fires, that we feel that we have the cart before the horse and that a radical change in the law is demanded.

We must prevent as far as possible the starting of forest fires, and therefore the state board of forestry of Wisconsin has decided to urge upon our legislature the great importance and necessity of providing a forest fire patrol in northern Wisconsin, upon the following lines:

A chief forest fire patrol, appointed by and under the supervision of the state board of forestry,, with headquarters at some central point. He should be a practical woodsman, with a wide knowledge of the northern part of the state, and the ability to handle men. He should be supplied with an office and such clerical help as may be necessary.

In each of twenty-five or more of the northern counties there should be located at some central point a head county fire patrol, in charge of the work

in his county. He should be under the direct orders of his chief, report to him weekly, be obliged to keep one or more saddle horses, and cover every part of his county at stated intervals.

Under the direct supervision and orders of the head patrols in each county would be county forest fire patrols, varying in number according to the size of the county, and the amount of forest land to be protected, but sufficient in number so that each man would not have over 40,000 acres of land to patrol. For the twenty-two northern counties which it is proposed that the patrols shall cover, it is expected that at least 322 men will be required. The plan is that all these men shall be secured from lumber companies who only operate in winter, as thus their best men would be given work every summer, the state would secure the services of trained woodsmen, and both the state and the lumber companies would gain the great advantage of having permanent men upon whose ability they could count. Each county patrol would have a given territory to look after and for which he would be responsible, they would live in cabins or shacks, and whenever possible they would be mounted so as to patrol quickly and to get to a fire with the least possible delay. They should be instructed to at once call upon every settler in their territory, explain the fire laws thoroughly, and in every way try to make the settlers appreciate that they are working for their interest and want their hearty co-operation.

As soon as funds are available, telephone lines should be built to connect all the patrol camps or cabins, so that the head patrol could call all his men together at any point in the county to fight fire, and wherever possible watch towers should be built, where men would be stationed in dangerously dry times to immediately report signs of fire in any direction. Such watch towers have been built by the lumbermen in Maine and have proved very useful.

During wet seasons when there is practically no danger from forest fire, the head patrol in each county should call his men together and clear up old logging roads, logging railroad rights of way, trails, etc., so that they could be used as fire lines. This is very important as our experience in fighting fires for the last few years has proved over and over again that the men are seriously handicapped in checking fires promptly, from the fact that there are so few roads which are kept clear of brush, and therefore they have no fire line to fall back upon in case of necessity. Much good can also be done by felling old snags, which are the means of spreading fire to a great distance in a heavy wind and also by burning at favorable times heavy and dangerous slash where it is a constant menace to adjoining timber or other property.

In this connection it should be noted that it is proposed to include in the law an important provision giving the state board of forestry power to order the burning of dangerous slash, so as to provide a reasonably wide strip next to adjoining property which is menaced by such slash, and that if the owner of the land or the timber fails to comply with the order of the board within a specified and reasonable period, the state board of forestry shall burn such slash, the cost thereof to be a first lien upon the land or timber. If the state of Wisconsin is not to have a general slash burning law, it is absolutely necessary that the state, through some board or commission, should have the right to determine when and where slash is such a public nuisance that it must be destroyed. In this way each case can be carefully considered and the law, if enforced fairly and efficiently, should be a very effective means of forest protection.

One of the most important provisions of the proposed law is to provide that no fires shall be set by any one from April 1st to December 1st (except for warming the person or cooking food) without a written permit from a patrol or fire warden. This would mean that any fires set for the purpose of

clearing land, burning brush or slash, without a written permit, would be absolute evidence of violation of the law, sufficient to secure conviction. The objection may be raised that the settler is obliged to use fire very freely in order to make a farm on land covered with young timber, brush and slash. This is of course true, but our records of forest fires in Wisconsin for the last six years show that from forty per cent to seventy per cent of all the fires have been caused by settlers burning brush. A large proportion of the settlers in the forest regions of the state are grossly negligent in the use of fire, and often apparently indifferent to the damage which they may cause to the property of others. They frequently select the dryest and most dangerous times to start their fires, and fail to take reasonable precautions to prevent the fire spreading.

Under the proposed plan, the local patrols and fire wardens would be authorized, as agents of the state board of forestry, to issue permits to set fire when it was safe to do so, and the patrols would be instructed to assist new settlers by showing them how to burn safely and to use their authority reasonably, so as to secure the co-operation of the settlers. Campers, hunters and fishermen must be allowed to build fire at any time, as this is necessary both for cooking and warmth, but the patrols should keep in close touch with all such parties and arrest them promptly for leaving a camp fire unextinguished.

It will be noted in this proposed plan that the patrols are intended in every possible way to prevent the starting of fires. They will of course be a well organized body to fight fires when they occur, but their first and main duty will be to prevent fires starting. However, under the best possible system some fires will always occur, and in order to have an auxiliary force, under the direction of the patrols and which they can call in time of necessity, it is proposed to appoint county fire wardens and do away entirely with the present system of town fire wardens. Many of the town boards have seriously handicapped the work of the wardens by failing to promptly pay the wardens, and the men called out by them. Men will refuse to fight fire if they are obliged o often wait a year for their pay. Most town boards are also strongly averse to allowing any pay if their wardens help to fight fire in adjoining towns, though such fires may at any time destroy much valuable property in their own town. Therefore, it is necessary in order to secure good results to appoint the wardens for the county, instead of the town, and give them full authority to fight fire anywhere in their own or adjoining counties. The present limit of $100 per township, or 36 sections, for fighting fire is entirely inadequate, and therefore it is proposed to increase the limit which any county may expend in any one year to $300 per township. Thus, if a county contains 20 townships it could expend a total of $6,000 in fighting fire, but it should also be provided that the county board of supervisors could exceed this amount in cases of great necessity.

In order that the fire wardens and the men called out by them should be paid promptly, it is proposed that the state shall pay the men and collect the expense from the counties. The patrols should keep in close touch with the wardens and arrange with them as to the men who should be called out in case of fire, and thus build up a well trained organization for the control of forest fires.

Wisconsin now has a forest reserve of some 340,000 acres, largely upon the headwaters of the Wisconsin and Chippewa rivers, but in order to protect this important watershed, preserve this beautiful lake region as a summer resort for the citizens of Wisconsin and other states,, and also to have a forest reserve large enough to be a factor in supplying the wood using industries of the state with timber, the state board of forestry will urge the necessity of acquiring a forest reserve of approximately 2,000,000 acres. The land must be purchased and in order to raise the necessary funds for the creation of an

adequate forest reserve, including its protection and improvement, and also to pay for the fire patrol system in northern Wisconsin, the legislature will be asked to grant the state board of forestry the proceeds of a two-tenths of a mill state tax for a period of twenty years. This general state tax will yield a yearly revenue of approximately $600,000, and it is estimated that the cost of the patrol system will amount to $250,000 per year. However, the amount which may be expended in the patrol system should be extremely elastic in order to meet varying conditions, and the forestry board should be authorized to expend the entire income of the department if it was found necessary to do so, in an unusually dry and dangerous year.

At first glance, $250,000 may seem a very large amount to expend annually for forest fire patrols, but in the 22 counties which it is proposed to patrol, there are about 12,000,000 acres of wild or unimproved lands, most of which are covered with some kind of forest growth, so that the cost would be from two to three cents per acre, and if the patrol system is at all successful, in protecting property, the cost will really represent a very low rate of insurance. Nothing has been said in regard to fires set by the railroads, and this is not from lack of full appreciation of how serious the loss has been from forest fires set in this way, but from the fact that the best remedy has not been found, though both the state of Wisconsin and the railroad officials are working to solve this difficult problem. Our records show that in ordinary years the railroads are only responsible for about fifteen per cent of the forest fires, but the past summer was so dry that the least spark would start a blaze and therefore in 1910 the railroads started about twenty-two per cent of the fires.

There are many kinds of spark arresters that will prevent the escape of all sparks, but none has yet been found that will both prevent the escape of sparks and still allow the engine to steam freely, and pull its load. But many men are working to solve this problem and the correct solution should come in time. In the meantime, however, the spreading of forest fires must be stopped, and it is simply a question of the best and most effective methods. Some advocate that all railroad rights of way be kept absolutely clear on both sides of the track. Others place more faith in a close fire patrol on railroad lines, especially of patrols on speeders who will follow up each train and extinguish all small fires that are set. Personally, I believe that a combination of fire lines and patrols, will prove most effective, but that every effort should be made to find a spark arrester that will still allow the engine to steam freely.

The American people as a whole are uncivilized in their apparently stoical indifference to the appalling annual losses from forest fires. The problems involved are tremendous ones, but they can be solved if only the nation, state and individual care enough to devote the hard work and large sums that will be required. This Lake States Forest Fire Conference leads me to hope that the time of mere talking is drawing to an end, and that very soon real action to save our forest resources will commence.

SOME THINGS A FOREST RANGER SHOULD KNOW

By C. H. SHATTUCK.

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A BRIEF summary of the information which a young man about to enter the forest service as a ranger should have may be of interest. In my judgment the first essential is a knowledge of the general geography of the district which he is to supervise. It is very necessary that he be able to direct those under him as to the location of meadows for the pasture of horses, the name and course of various streams, the trend of mountain chains, and the names and locations of prominent peaks. He should have a very thorough knowledge of roads, trails, and the location of cabins, and the manner of constructing each. He must also know how to handle horses. The ordinary mountain cayuse instinctively knows the tenderfoot, and will proceed on the slightest provocation to reveal bits of equine ingenuity which are sometimes surprising and often aggravating in the extreme.

It is imperative that he be familiar with the business of packing; this can only be acquired by actual practice, either in his college course or in the field. Many a young man has come to grief in the practical rangers' examination because he could not put up in a permanent manner a conglomeration of cooking utensils, axes, shovels, cross-cut saws, provisions, and sleeping and wearing apparel. He must know how to throw the diamond-hitch and the various swings and loops for holding each of the above necessaries on the back of a sliding, climbing, jumping horse. Roads and trails are often steep and sometimes barred by various sized logs, the jumping of which by the horses tests thoroughly the packer's skill in the use of rope.

The ranger must be able to select suitable provisions and must know how to do ordinary cooking. He must have things which cannot be brought from the far-a-way bakery. Bread must be made, meats prepared and cooked, and various vegetables and cereals come in for their share of attention. Making camp is another important feature. In selecting a site the essentials are: Good grass for his horses, good water for camp purposes, if possible good fishing, and in dry seasons, such a location that the fires may not burn his entire outfit. In addition he should make it his business to be familiar with the forest laws, and the rules and regulations affecting his reserve. He should know as intimately as possible the people who reside within the boundaries of his district, as much of his success will depend upon the wise and tactful manner in which he conducts himself in all his relations with them. He should know, if he should be in a grazing region, the brand and ear-marks of the stock in his district, and the approximate number owned by each individual. He must know the timber of his district both as to stands and kinds of trees. If lumbering operations are conducted he should see to it that the cutting and

burning is carried out according to contract. In much of this western country it devolves upon him to act as a protector of game. The actual settlers are generally glad to stay within the limits of killing fixed by the game laws, and they do not approve of the intrusions of the poacher, whose main object is to kill as much as possible without regard to law. As an officer of the law, the ranger is a great influence in ridding the reserve of ruthless hunters who kill often for horns and teeth only.

Such in brief, is the essential information which a ranger should have. Over and above this he should be a man who is able to impress those with whom he comes in contact with the idea that he stands for law, for justice to all and malice toward none. He must be fearless in the exercise of the duties devolving upon him, some of which require courage, and others great powers of physical endurance. It is desirable that he be not too far removed from the land of his birth, as the native will be much more apt to deal in a manner to be commended with the many perplexing problems constantly coming up than one brought from a distance.

EDITORIAL

WORK UNDER THE NEW FOREST LAW

THE Forest Service had been preparing for action in view of the probable passage of the Weeks bill for some time before it became a law and no time was lost in preliminaries. All arrangements have been made for making public the necessary information and for putting men in the field, so that purchases may be made before the close of the fiscal year. It is, therefore, timely to consider what is needed to obtain most promptly the results expected from the law.

As already stated, conditions are so acute in the White Mountains and the territory to be considered is so much more circumscribed than in the south that immediate action is called for there. It will also be easier to make purchases in that section during what remains of the fiscal year because titles are so much clearer than in the southern mountains, and the owners are so much less numerous. It may fairly be expected then that the first action to be taken by the government authorities will be in the White Mountains.

In these mountains, owing to the local conditions, the primary need is to secure for protective purposes the timbered upper slopes on the several drainage areas, all of which are in danger of early destruction and are needed to be preserved to protect the ultimate water sources and the soil without which these mountain-sides will be of little use.

Next in order would seem to come the cut-over upper slopes in the same regions, in order that the work of restoration may begin before the soil denudation is completed.

Third, the administrative units may be completed by acquisitions on the lower levels. Thus the work of protection, which is the main purpose of the law, will be logically developed.

Finally, there are two areas outside of the White Mountains proper the protection of which is necessary to comply with the purposes of the law. One of these is the great forested north country of Coos County, about the headwaters of the Connecticut, the most important navigable stream of New England. The other is the Magalloway country in Maine and New Hampshire, an important part of the Androscoggin watershed. We believe that the full carrying out of these plans involves the purchase of about a million acres in the north, and that something over four million acres are needed for the national holdings in the south, where the exact areas are not yet so definitely indicated. In the northern mountains the plan has been carefully studied by many experts and the requirements are well understood. There need be little delay, therefore, in mapping out the exact plan of procedure.

In the announcement made elsewhere of the plans of the department we call especial attention to Secretary Wilson's statement that he expects a great deal of public spirit to be shown in offering lands to carry out this great policy. We hope he may not be disappointed.

AN UNFRIENDLY APPOINTMENT

THAT the Speaker of the late House of Representatives was a bitter enemy of Appalachian-White Mountain forest legislation and that he is a determined and persistent fighter were perfectly well-known facts. We hardly supposed, however, that he would carry his hostility after the Weeks bill was passed to the point of naming, as one of the National Forest Reservation Commission provided for under the new law, a man who had been always an opponent of the measure, unwilling to see any good in it, and whose residence on the Pacific Coast precludes knowledge of the conditions in our eastern mountains. So incongruous did this appointment seem that a long statement was made to some of the newspaper correspondents to explain why Mr. Hawley of Oregon would be a peculiarly useful member of the Commission.

Of Mr. Hawley's integrity and sincerity we make no question and we believe he will act conscientiously as a member of the Commission. We believe, however, that it is quite unprecedented to appoint to administer a law a man who is so entirely out of sympathy with its purpose and unacquainted with the conditions it was framed to meet. In making such an appointment Mr. Cannon simply showed his continued determination to oppose the new law and to do what he could to make it a failure. Fortunately, this is very little since Mr. Hawley is but one of seven.

It may be a question under the terms of the act whether any of these appointments are valid beyond the term of the 61st Congress. For the act says: "Provided, that the members of the commission herein created shall serve as such only during their incumbency in their respective official positions, and any vacancy on the commission shall be filled in the manner as the original appointment."

These members were appointed as members of the 61st Congress by the presiding officers of that Congress. Does this appointment run beyond the life of this Congress?

THE REPORT ON THE LUMBER INDUSTRY

THE report on the lumber industry by the Commissioner of Corporations, Herbert Knox Smith, of which we have already published a summary, is a document that yields new light on close study; but its importance should not be exaggerated. There is an old story, familiar to everyone, of the shield one side of which was silver and the other of gold, and of the controversy that arose between two men each of whom looked at only one side. It may be suggested in passing that Commissioner Smith's report was made by an able lawyer whose especial business has been hunting for trusts and monopolies and the consequences thereof. His report on the lumber industry reflects this acquired attitude. It looks at one side of the shield only, and its value must be rated with that in mind.

The first fact suggested by it we briefly called attention to last month. The concentration of timberland ownership which forms the burden of the report is the result of a public policy which we now see was lacking in wisdom and forethought, although it seemed to fit the conditions of development of a new country. The result has been, instead of the general distribution of the national wealth which was intended, concentration of this wealth in comparatively few hands. For this there is no remedy and we must simply accept the fact. As we have said, the fact is an argument plain and unanswerable for national or state ownership of as large a part of the forests

that remain as possible, and for the thorough development and management of these public holdings so that they will constitute the chief single factor in lumber production and so equalize conditions and balance the market. This is not an easy goal to arrive at, but it is practicable. Our national and state forest services must be developed to the highest point of efficiency and they must have the people back of them for they represent the people's end of this enormous business.

Another thing that does not appear in this report but may in the sections that are to follow is the difference between these large timberland owners and the lumber manufacturers and the small owners. We surmise that in any controversy that may arise the side of these latter factors would be the people's side. Their interest is against concentration of ownership in private hands of the timberlands from which their industry derives its life. Right here it may be appropriate to make an observation about the so-called lumber trust, the bogey which is so often brought out to frighten the people and irritate the lumbermen. Commissioner Smith has shown the possibility of a timberland trust but that there is any likelihood of a dominant trust in lumber trade or manufacturing, no one can believe who has the slightest knowledge of the condition and of the keenness of the competition to the extent almost of chaos. A sharp distinction must be drawn between the ownership of timber and the lumber industry. Sometimes they go together. Often they do not.

Another point should be noted. Mr. Smith discusses the rise in the value of standing timber, solely from the point of view of the concentration of ownership and consequent control of production. This should be considered in connection with other conditions that normally affect prices. The rapid decline of the available supply in the face of an increasing distance and difficulty of access of the available supply are two important elements which would inevitably cause a large increase in cost if there were no holdings of over a hundred acres in the country.

These notes on the report are intended rather as suggestions than as discussion. We wish that a forestry expert might have been joined with the Commissioner of Corporations in this investigation because it seems to us that in that case we should have had a broader report and more conclusive results.

THE SECRETARYSHIP OF THE INTERIOR

WE WELCOME the appointment of Mr. Walter L. Fisher to the secretaryship of the Interior as that of a man who has shown a high sense of honor and of public duty, sound views, and an exceptional capacity for independent judgment. His record and affiliations justify confidence that he will administer his great department with an eye single for the general welfare.

The retirement of Mr. Ballinger is not to be regretted. The controversy of which he was the center assumed unfortunately so personal a character and was so obscured by political considerations that it failed to be disposed of to anybody's satisfaction. The fact remained that Mr. Ballinger had become, justly on unjustly, *persona non grata* to the American people as a cabinet officer. His usefulness ceased some time ago. The continuance of the personal feud embarrassed many departments and bureaus of the government, and the change will be a relief that will work to the public advantage. The whole episode was most unfortunate and our relief that it is over is so great that we do not care to revive any of the old questions.

A BOURBON OF BOURBONS

IT IS much to be regretted that the country as a whole does not know Senator Heyburn of Idaho, and his unreason and absurdities are not always analyzed and valued at their real worthlessness. We have actually seen editorials from papers in the east accepting as valid his violent attacks on the Forest Service and making them the text of approving discussion. To those who are acquainted with the methods and habits of mind of the senator from Idaho this seems impossible. It should be understood that he is against the Forest Service, all its works, and anything connected with it. With this knowledge as a key, much can be understood and allowed for. His is a Bourbon mind—never learning and never forgetting anything. His attack on the new national forest bill when it was before the Senate on the fifteenth of February was so absurd as to be a serious reflection upon the dignity of the Senate. With some opponents argument is possible. Senator Heyburn's method is to press his point by brute force and yield only when overcome by greater force. With him argument is impossible.

THE CRAWFORD NOTCH IN DANGER

AS THIS is written, the project for the purchase of the Crawford Notch by the state of New Hampshire halts in the Legislature. Meanwhile a hundred ax-men have already begun the work of denudation.

We have commented recently more than once on the notable progress made by New Hampshire in forestry, and it is incredible that the state can be so blind to its own best interests as to allow this opportunity for self-help to slip by. In times past narrow and selfish interests have too often dominated the state to its own detriment, but the recent awakening, the progressive legislation, and the election of Governor Bass all gave promise of better things. Here, however, is an opportunity that is likely to be a test. The cost is not excessive. One hundred thousand dollars is a reasonable price for this property when its many-sided value to the state is considered. On the other hand, New Hampshire cannot afford at any price to have the Notch denuded and thereby changed from a green and picturesque valley, one of the scenic wonders of the state, to a gray, scarred waste. At every season of the year the Notch has its peculiar beauty. As a travelled pass into the mountain country it is worth much to the state of New Hampshire. As the source of the Saco it means much to industry; but it is one of the striking examples of mountain sides that can never have their forest growth restored if they are once laid bare.

There is another side to the question. Neighbor states have been fighting New Hampshire's battle for national preservation of the chief watersheds of the White Mountains. The battle has been won, but it was hardly won, and the fruits of it are by no means certain. It has been conceded that New Hampshire is not a wealthy state and could not handle this whole project alone; but it has not been conceded that New Hampshire with its nominal debt is poverty stricken or helpless. The new national forest bill as passed is a general bill and New Hampshire can only have its share by deserving it. If the state will not help itself when its interests are so plainly at stake there will be slight inclination on the part of the national authorities to come to its assistance. And there will be no lack of applicants for the few million

dollars provided for in the new forest law just passed. There is a plain duty before the state of New Hampshire. This duty is to save the Crawford Notch to be the permanent possession of the people of the state and thereafter to secure such other of its mountain forest tracts as would not naturally be included in the national holdings and are especially indicated as the property of the state. In this way only can the full value of the new national forest law be secured. It is not contemplated by any one that all the lands that must be public forest reservations should be owned by the national government. It is proposed that the national government should hold the great interstate watersheds of navigable rivers and that this should be a nucleus for state and private holdings which may be under the same or similar forest administration and protection. The friends of New Hampshire who have worked early and late for many years past to secure through the nation the protection that was desired, look to the state to prove by its own actions that it deserves the interest that has been lavishly given to it.

CURRENT LITERATURE

REVIEWS

The Mississippi River and its Wonderful Valley. By Julius Chambers, Fellow of the Royal Geographic Society, Member of the National Geographic Society. With 80 illustrations and maps. pp. xvi, 308. G. P. Putnam's Sons, New York and London, 1910.

Mr. Chambers has made in this volume on the "Father of Waters" an interesting addition to the handsome Putnam series on American waterways. The human and historic sides of the great river's life interest the author especially, and there is slight discussion of physical conditions, or engineering, waterpower, and transportation problems. Reviewing briefly the the early conjectural period of Mississippi River discovery, the work of De Soto, and the much more extensive and fruitful French explorations, the author comes down to the days of the English and Americans, the Louisiana purchase, and the early explorations to discover the somewhat elusive source of the river. The most interesting part of the volume is the chapters given to an account of the author's own explorations, undertaken in 1872, to complete the reconnaissance carried on by Schoolcraft in 1832, and Nicollet in 1836, resulting in the discovery of Elk Lake. After this exploration the author went by canoe to Saint Louis, and then by steamboat to New Orleans. There is a chapter on the delta and a brief one on "The Age of Water," after which the author turns to the modern history of the river. Were any criticism to be made of this entertaining volume it would be that there is a lack of continuity in the narrative, and too frequent interjection of irrelevant matters.

The Cost of Growing Timber. By R. S. Kellogg, Secretary Northern Hemlock and Hardwood Manufacturers' Association, and E. A. Ziegler, Director Pennsylvania State Forest Academy. American Lumberman, Chicago, 1911.

This interesting and practical pamphlet is a development of a paper prepared by the authors and presented at the seventh annual meeting of the National Lumber Manufacturers' Association, in Seattle in July of 1909. The discussion occasioned by the paper and subsequent study of the subject led them to revise the original manuscript, and publish it in its present form in the belief that its principles are sound and will help toward a clearer conception of the conditions which must be established in the United States if forest conservation is to be a reality. The key to the discussion may be found in a sentence in the introduction: "The permanent timber supply will not be maintained by private effort at less than the cost of production." The object of the pamphlet is to present a method of analysis of the elements of cost of growing timber. These, the authors say, are five: (1) the value of the land; (2) the stocking of it with young trees; (3) the administration of the operation, and the protection of the growing timber; (4) the taxes; (5) the rate of interest. These elements are then discussed in general, following which detailed studies are made of the yield of certain trees. The trees chosen are the white pine, the loblolly pine, the long-leaf pine, red oak, and Douglas fir. The authors then draw certain general conclusions as to the profitableness of the production of the species examined. An appendix contains some cost tables which will be serviceable in making computations.

As a beginning of a study of a most important subject, this pamphlet is practical, suggestive, and will well repay careful examination by everyone interested in the production of timber.

Handbook of Conservation. By Mrs. Fred H. Tucker, Chairman of the Conservation Department, Massachusetts State Federation of Women's Clubs, pp. viii, 911. Boston, 1911.

This little handbook, a kind of syllabus and note-book, is the result of painstaking work by the able chairman of the conservation department of the Massachusetts State Federation of Women's Clubs. Very few women have given more years of careful and really scientific study to the subject of forestry and conservation than Mrs. Tucker. This handbook, she says, has two objects. First, to present an orderly series of suggestive topics upon the conservation of our natural resources, and second to furnish explanatory comments upon the various phases of the subject. The topics are intended as a guide to study and may be used as headings for papers, assignments for class work, or merely as a convient analysis for the general reader to keep in mind the salient points and the logical development of the subject. The comment is largely in the form of quotations from well-known experts or practical men of affairs. The book was prepared especially for the use of women's clubs, but all students of conservation subjects will find it serviceable. The author explains that no attempt has been made to preserve due proportion among the parts. It has been the aim to elaborate some phases at the expense of others. There is a general outline of the conservation of our natural resources, and then chapters are devoted to ores and minerals, to lands and soils, to waters, to forests, to the ownership and control of natural resources, to birds, and to shade trees. There are two final chapters, one containing practical suggestions, and one a bibliography. The work in this handbook is well done. It is what it claims to be,—highly suggestive and useful as an elementary guide. We heartily recommend it to lay students of forestry and conservation subjects.

MONTHLY LIST FOR MARCH, 1911

(Books and periodicals indexed in the Library of the United States Forest Service)

Forestry as a Whole

Abert, Federico. Apuntes forestales. 22 p. Santiago de Chile, Imprenta Cervantes, 1910.

West Virginia—State board of agriculture. Report for the quarter ending Dec. 30, 1910; forestry. 44 p. Charleston, W. Va., 1911.

Bibliographies

United States—Department of agriculture—Division of publications. Publications of the Forest service. 6 p. Wash., 1911. (Circular 11.)

Forest Aesthetics

Street and park trees

Allendale, N. J.—Shade tree commission. Statutes and ordinance. 19 p. Allendale, 1910.

Chicago—Special park commission. Trees; when and how to plant. 15 p. il. Chicago, 1910. (Pamphlet no. 4.)

Levison, J. J. What trees to plant and how. 4 p. Brooklyn, N. Y. (American association for the planting and preservation of city trees. Publication.)

St. Louis, Mo.—City forester. Second and third annual reports. St. Louis, Mo., 1908-9.

Washington, D. C.—Superintendent of trees and parkings. Twenty-fifth annual report, 1910-10. 7 p. Wash., D. C., 1910.

Forest Education

Biltmore forest school. A forest fair in the Biltmore forest, Nov. 26, 1908. 55 p. il. Biltmore, N. C., 1908.

Forest Legislation

Maine—Forest commission. Maine forestry district; law creating fire district; instructions to wardens; list of wardens appointed. 31 p. Augusta, Me., 1910.

United States—Congress. An act to enable any state to cooperate with any other state or states, or with the United States, for the protection of the watersheds of navigable streams, and to appoint a commission for the acquisition of lands for the purpose of conserving the navigability of navigable rivers. 8 p. Wash., D. C., 1910. (U. S.—61st congress—3d sessions. House of Representatives 11798.)

Wisconsin—Legislature—Committee on water powers, forestry and drainage. Report, 1910. pt. 1-2. diagrs., tables. Madison, Wis., 1911.

Forest Description

Brooks, A. B. Forestry and wood industries. 481 p. pl. Morgantown, W. Va., 1911. (West Virginia—Geological survey. Report, v. 5.)

Hall, R. Clifford and Ingall, O. D. Forest conditions in Illinois. 79 p. pl. Urbana, Ill., 1911. (Illinois state laboratory of natural history. Bulletin, vol. 9, art. 4.)

Forest Botany

Plant pyhsiology

Bailey, Irving W. Oxidizing enzymes and their relation to "sap stain" in lumber. 7 p. Chicago, University Press, 1910.

Silviculture

Graves, Henry Solon. The principles of handling woodlands. 325 p. front., il. N. Y., J. Wiley & sons, 1911.

Planting

American forestry company. Little tree farms, nurseries department. 17 p. South Framingham, Mass., 1911.

Forest Protection

Insects

Rohwer, S. A. The genotypes of the sawflies and wood wasps, or the snperfamily Tenthredinoidea. 31 p. Wash., 1911. (U. S.—Department of agriculture—Bureau of enteomology. Technical series no. 20, pt. 2.)

Snyder, T. E. Damage to telephone and telegraph poles by wood-boring insects. 6 p. il. Wash., 1911. (U. S.—Department of agriculture—Bureau of entomology. Circular 134.)

Stebbing, E. P. A note on the lac insect, Tachardia lacca, its life history, propagation and collection. 2d ed. 82 p. pl. Calcutta, 1910. (Indian forest memoirs, Forest zoology series, v. 1, pt. 3.)

Forest Economics

Taxation and tariff

Mowry, Jess B. Forest taxation. 3 p. Providence, R. I., 1911. (R. I.—Commissioner of forestry. Leaflet no. 3.)

United States—Congress—House. Extracts from congressional debates on the reciprocity treaty of 1854 with Canada. 185 p. Wash., D. C., 1911. (U. S.—61st congress—3d session. House document 1350.)

United States—President. Canadian reciprocity; special message. 75 p. Wash., D. C., 1911. (U. S.—61st congress—3d session. Senate document 787.)

United States—Tariff board. Reciprocity with Canada; a report from the Tariff board relative to various commodities named in the proposed Canadian reciprocity measure. 132 p. Wash., D. C., 1911. (U. S.—61st congress—3d session. Senate document 849.)

Statistics

Macmillan, H. R., comp. Forest products of Canada, 1909; pulp wood. 9 p. Ottawa, 1910. (Canada—Department of Interior — Branch forestry. Bulletin 12.)

Prussia—Ministerium für landwirtschaft, domänen und forsten-Abteilung für forsten. Amtliche mitteilungen, 1909. 47 p. Berlin, J. Springer, 1911.

United States—Bureau of census. Wood distillation, 1909. 11 p. Wash., D. C., 1911. (Forest products no. 7.)

Forest Administration

India—Andaman Islands—Forest department. Progress report of forest administration in the Adamans for 1909-10. 30 p. Calcutta, 1910.

Pennsylvania—Department of forestry. Report for the years 1908—1909. pl. Harrisburg, Pa., 1910.

Quebec—Department of lands and forests. Report for the 12 months ending 30th June, 1910. 257 p. pl. tables. Quebec. 1911.

Rhode Island—Commissioner of forestry. Fifth annual report, for 1910. 35 p. pl. Providence, 1911.

United States—Department of agriculture—Forest service. Report of the forester for 1910. 67 p. Wash., D. C., 1910.

Forest Utilization

Lumber industry

United States—Department of agriculture—Forest service. Record of wholesale prices of lumber based on actual sales made f. o. b. each market for each quarter of 1910; list A. 22 p. Wash., D. C., 1910.

United States—Department of agriculture—Forest service. Record of wholesale prices of lumber, based on actual sales made F. O. B. mill for each quarter of the calendar year 1910. 24 p. Wash., D. C., 1910.

United States—Department of commerce and labor—Bureau of corporation. Summary of report on the lumber industry. pt. 1. 38 p. map. Wash., D. C., 1911.

Wood using industries

Maple flooring manufacturers' association. Official maple flooring book, containing concise and authentic information for architects and builders concerning the characteristics and uses of maple, beech and birch flooring. 39 p. il. Chicago, 1911.

Oakleaf, Howard B. Wood using industries of Oregon, with special reference to the properties and uses of Oregon woods. Portland, Ore., Oregon conservation association, 1911.

Forest by-products

Ricard, J. H. Exploitation des forêts résineuses au pays landais. 27 p. il. Paris, P. Renouard, 1910.

Periodical Articles

General

Annals of botany, Jan., 1911.—The morphology of leaf-fall, by E. Lee, p. 51-106; The relation of the leaf trace to the formation of compound rays in the lower Dicotyledons, by I. W. Bailey, p. 225-41.

Cassier's magazine, Feb. 199.—Lumbering in the world's greatest forests, by A. W. Day, p. 291-306.

Country life in America, March, 1911.—The Arnold arboretum, by W. Miller, p. 347-50.

Gardener's chronicle, Dec. 24, 1910.—Christmas trees, p. 470.

Gardener's chronicle, Dec. 31, 1910.—The European black poplar, by J. Fraser, p. 483.

Outlook, Jan. 28, 1911.—Forest fire problem, by W. D. Hulbert, p. 207-13.

Plant world, Feb., 1911.—The ancestry of the bald cypress, by E. W. Berry, p. 39-45.

Popular electricity, Dec., 1910.—Where lightning strikes, p. 701-2; Learning to use our forest products, by D. L. Geyer, p. 714-17.

Quarterly review, Jan., 1911.—Woods and forests, by J. C. Medd., p. 91-15.

Scientific American, Feb. 18, 1911.—Dynamite on the farm, by W. Young, p. 163.

World's work, Mar., 1911.—A museum of living trees; the Arnold arboretum, of Harvard University, which is gathering every tree and shrub in the world that will grow in the latitude of Boston, by F. L. Bullard, p. 14147-58.

Trade journals and consular reports

American lumberman, Feb. 18, 1911.—Stature, durability, strength, of douglas fir, p. 1, 83.

American lumberman, March 4, 1911.—Cost of producing yellow pine lumber, p. 42-3.

American lumberman, March 11, 1911.—Railroads and lumbermen, by W. W. Finley, p. 47-8; Forest conservation, by H. S. Graves, p. 40-1; Forestry in New York, by C. R. Pettis, p. 52; National forest system, by G. Pinchot, p. 52.

Barrel and box, Feb., 1911.—Report on white oak staves and timber in foreign countries, by J. I. Brittain and others, p. 33-4.

Canada lumberman, Feb. 1, 1911.—Timber trade of Ontario during 1910, p. 26-8; Lumber trade of Quebec during 1910, p. 30-2; Growth of Canada's pulpwood industry, p. 32-4; Increasing volume B. C. lumber trade, p. 35-7; Forest fires in B. C. during 1910, p. 37; Surveying and mapping timber limits; how a large manufacturing company takes stock of its forest resources, by F. Cook, p. 38-9; Lumber trade of Maritime Provinces, p. 40-1; Great Britain's lumber trade improved, p. 42-4.

Canada lumberman, Feb. 15, 1911.—Business methods in lumbering, by Thomas, p. 37; Consumption of poles during 1909 in Canada, by H. R. MacMillan, p. 46.

Engineering news, Feb. 2, 1911.—Asphaltic oils for the preservation of railway ties, by F. W. Cherrington, p. 122-3; Keeping record of treated ties, by F. J. Angier, p. 143.

Engineering news, Feb. 16, 1911.—A bamboo arch bridge in Java, Dutch East Indies, by W. G. Bligh, p. 195.

Hardwood record, March 10, 1911.—Paper birch of the northeast and its utilization, p. 30.

Lumber world, Feb. 15, 1911.—Hunting African mahogany, p. 23-4.

Mississippi Valley lumberman, March 3, 1911.—Quality and economy; the conservation of energy as applied to logging, p. 46.

Pacific lumber trade journal, Feb., 1911.—Fallacies of "light burning" forest protection, p. 45.

Paper trade journal, Feb. 16, 1911.—The Forest service ground wood laboratory, by H. S. Bristol, p. 45, 49, 53, 231; New paper making fibre, by C. R. Dodge, p. 147; The pulp woods of Canada; a classification of the kinds and species, by J. A. De Cew, p. 173-5; Mechanical treatment, its growing importance in connection with chemical reactions, by C. Beadle, p. 179-83; Wood supply problem; use of additional kinds, and mill and lumber waste will solve it, by W. L. Hall, p. 205-11; No more wasting of wood; by a new method practically all parts of the tree can be converted into pulp, by A. A. Tanyane, p. 293-5.

Railway and engineering review, March 4, 1911.—What percentage of creosote oil can be withdrawn from wood by subsequent vacuum, by C. D. Chanute, p. 179.

St. Louis lumberman, Feb. 15, 1911.—Band resaws, by E. C. Merschon, p. 21-2; Forestry, by W. B. Townsend, p. 25-6; Paper making in China, by H. A. Nightingale, p. 121.

St. Louis lumberman, March 1, 1911.—C-A-Wood preserver company, p. 27; Wood waste and its utilization, by G. B. Frankforter, p. 56-7; Tupelo for boxes, p. 77; The "Diamond" brand of saw mill machinery, p. 78-9; A useful machine for retail lumbermen; the Oshkosh portable saw rig, p. 80-1; Latest news from the wood block paving field, p. 82.

Southern lumberman, March 4, 1911.—Progress of forest conservation in Mas-

sachusetts, p. 30; Lumber production in Canada, by F. S. S. Johnson, p. 32.

Timber trade journal, Feb. 25, 1911.—Brazilian timbers, p. 265.

Timberman, Feb. 1911.—Charpitting stumps successfully, by W. H. Sparks, p. 28-9; Japanese forestry, by F. Goto, p. 31; Suggestions for practical methods of making topographical surveys, by W. W. Amburn, p. 48 J.

United States daily consular report, Feb. 24, 1911.—Alcohol from sawdust, by F. H. Mason, p. 732; Shipments of Norwegian wood flour, by H. Bordewich, p. 734.

United States daily consular report, Feb. 27, 1911.—Canadian timber licences and reserves, by E. C. Wakefield, p. 764-5.

United States daily consular report, March 10, 1911.—Wood paving blocks for Italy, by J. B. Young, p. 922-3.

West coast lumberman, Feb. 1911.—Tree felling machine, p. 317.

Forest journals

Allegemeine forst-und jagd-zeitung, Jan. 1911.—Mitteilungen über bau und leben der fichtenwurzeln und untersuchung über die beeinflussung des wurzelwachstums durch wirtschaftliche einwirkung by Matthes, p. 16; Zur mathematischen interpretation der zuwachskurven, by T. Glaser, p. 6-10; Die Douglasie im winter 1908-09, by Walter, p. 10-13.

American forestry, March, 1911.—The people's possessions in the Appalachian forests, by Thomas Nelson Page, p. 133-44; Harvesting the annual seed crop, by S. Moore, p. 145-54; Growing trees from seed, by C. R. Pettis, p. 155-9; Reforestation in Massachusetts, by F. W. Rane, p. 160-63; The passage of the Appalachian bill, p. 164-70; The year's forest legislation in Vermont, by A. F. Hawes, p. 179-80.

Bulletin de la Société centrale forestière de Belgique, Jan. 1911.—La question des semences en sylviculture, by N. I. Crahay, p. 19-29; Des mélanges d'essences feuillues à réaliser dans les futaies de hêtre, by C. J. Quairière, p. 30-40.

Centralblatt für das gesamte forstwesen, Jan., 1911.—Die forstliche erschliessung der Insel Formosa, by A. Hofmann, p. 1-18; Studien über den flug des nonnenfalters, by W. Sedlaczek, p. 18-27.

Revue des eaux et forêts, Jan. 15, 1911.—Taux d'accroissement et tarière de Pressler, by E. Martin, p. 33-40.

Revue des aux et forêts, Feb. 1, 1911.—Une forêt en Morvan, by Gouget, p. 65-73; Excursion forestière au Portugal, by L. Pardé, p. 73-88; Le pin maritime au sud des Landes, by M. L. de Vilmorin, p. 92-6.

Schweizerische zeitschrift für forstwesen, Jan. 1911.—Eine anregung für den plenterwald, by G. Z., p. 5-8; Wirtschaftsplan und waldreglement, p. 8-13; Die Atlaszeder, by J. Businger, p. 15-18.

Schweizerische zeitschrift für forstwesen, Feb. 1911.—Die Walungen des Oberengadins, by Z. Ganzoni, p. 40-4.

Tharander forstliches jahrbuch, 1910.—Haupt-und zwischennutzungserträge der rotbuche in Sachsen, by M. Kunze, p. 97-110; Die Tharandter forstdüngungsversuche, by H. Vater, p. 111-35; Über bemerkenswerte, in sächsische forsten auftretende baumrankheiten, by F. W. Neger, p. 141-67; Termitenschaden; ein beitrag zur kolonialen forstentomolgie, by K. Escherich, p. 168-85· Überlick über die forstpolitischen zustände Sachsens, by Gross, p. 186-204; Gesetze, verordnungen und dienstanweisungen, welche auf das forstwesen besug haben, by Flemming, comp., p. 205-68.

Zeitschrift für forst-und jagdwesen, Jan. 1911.—Formen und abarten der gemeinen kiefer, by M. Kienitz, p. 4-35; Beiträge zur physikalischen bodenuntersuchung, by P. Ehrenberg, and H. Pick, p. 35-47; Forstliches aus Kanada, by von Berlepsch, p. 47-58.

NATIONAL FOREST WORK

Plans for Buying Eastern Forest Land

The National Forest Reservation Commission, provided for under the new forest law, is made up as follows: J. M. Dickinson, secretary of war; Walter L. Fisher, secretary of the interior; James Wilson, secretary of agriculture; J. H. Gallinger, senator from New Hampshire; J. W. Smith, senator from Maryland; W. C. Hawley, representative from Oregon; and Gordon Lee, representative from Georgia.

The Department of Agriculture announces, through a circular which is just published its plans for the purchase of land by the National Forest Reservation Commission created under the new Weeks forest law.

This law, as our readers know, was passed with special reference to the creation of national forests in the Appalachian and White Mountains. Under it the Secretary of Agriculture is to examine, locate, and recommend to the Commission for purchase such lands as in his judgment may be necessary for regulating the flow of navigable streams. The circular, which is now being printed, is intended to give information to the public as to where and what kinds of land are wanted. Owners of land, the purchase of which will be considered by the government, are expected on the basis of this information to make known to the Forest Service, which will conduct the work for the Department of Agriculture, their desire to sell. Copies of the circulars may be obtained by applying to the Forest Service.

The law is not restricted to particular regions, except that lands may be bought only in the states whose legislatures have consented to the acquisition of land by the United States for the purpose of preserving the navigability of streams. The states which have already taken the necessary action are Maine, New Hampshire, Maryland, Virginia, West Virginia, North Carolina, Tennessee, South Carolina, and Georgia.

The first lands to be examined for purchase will be in the southern Appalachian and White Mountains, which, because of their altitude, steepness, and lack of protection, are in a class by themselves. The area which is believed to need protection is much larger than the government can purchase. Much difference exists, however, between different parts of the region. Careful examinations, which have been going on for the last ten years, have proved that the conditions which affect streamflow to an extreme extent are to be found in relatively limited areas, which are scattered more or less widely. By careful selection it is believed that much can be done for the permanent improvement of the watersheds with the purchase of a relatively small part of the land.

A blank form for the offer of land accompanies the circular. Additional copies of this blank form may be had by writing the Forest Service at Washington. The kinds of land which will be considered for purchase, if they lie within the designated areas, are set forth by the circular as follows:

Timbered lands may be bought either with the timber standing on them or with reservation by the owner of the right to cut the timber under certain rules to provide for perpetuation of the forest. These rules will form a part of the agreement for purchase of the land. Since, however, the government cannot pay high prices, it is not regarded as probable that much land bearing a heavy stand of merchantable timber can be bought. Culled and cut-over lands may be bought, as well as land covered with brush which is useful for watershed protection, burned land, and abandoned farm land, whether cleared or partially, or wholly covered by young timber growth. Good agricultural lands will not be considered. Owners may reserve the right to remove valuable mineral deposits which are known to exist.

Proposals will be received for small as well as for large tracts, although small tracts can be examined only where the purchase of a considerable total of land in the same neighborhood is under consideration. With regard to the price which can be paid, Secretary Wilson indicates that the policy of the Commission will be to make the money available go as far as possible. "For the most part," he says, "we shall have to buy cut-over lands or lands without much merchantable timber. I want to make it plain at the start that I shall recommend this class of land only when it is offered very cheap. Proffers of land at exorbitant prices will not be considered. I am frank to say that I hope to see a great deal of public spirit manifested by land owners. I expect some lands to be offered at merely nominal prices, in order to aid the government in getting

well started upon this wise and necessary policy.

"The lands acquired by the government will be held as national forests. They will be protected from fire and the growth of the timber will be improved as much as possible. The lands will not be game preserves, but will continue to be open to the public for hunting and fishing in accordance with the laws of the state in which they are situated. All their resources will be available for the public under reasonable conditions. Another point which I wish to emphasize is that we are not going to take from people their homes in order to put the lands into national forests."

The areas within which offers of land are desired are set forth in detail in the circular of the Forest Service. The approximate location of these areas is as follows, although Secretary Wilson warns those wishing to offer land that they should first secure the circular in order to see whether their holdings fall within the more detailed areas therein indicated:

In New Hampshire, lands in the White Mountains region.

In Maine, lands in a portion of Batchelder's Grant in Oxford County.

In Maryland, a portion of the western part of Garrett County.

In Virginia, parts of Shenandoah, Rockingham, southwestern Warren, western Page, northern Bedford, eastern Botetourt, southern Rockbridge, southern Washington, Smyth, and Wythe counties, and western Grayson County.

In West Virginia, parts of Pendleton, Hardy, Randolph, and Pocahontas counties.

In Tennessee, parts of northeastern Johnson County, Cocke, Sevier, Blount, and Monroe counties.

In North Carolina, parts of Wilkes, Caldwell, Wautauga, Buncombe, Yancey, McDowell, southwestern Mitchell, Haywood, Swain, Jackson, Henderson, Transylvania, Macon, Clay, Cherokee, and Graham counties.

In South Carolina, a part of Oconee County.

In Georgia, parts of Rabun, Habersham, and White counties.

New Grazing Regulations

The Secretary of Agriculture has approved a revised form of the grazing regulations, which govern the use of national forest ranges. The most important departures from the old regulations are found, first, in the fact that provision is made for recognition of a permanent national advisory board representing the sheep and cattle interests, which will confer annually with the Secretary of Agriculture concerning grazing matters; and secondly, in the laying down of a rule that on forests where the quality of range and advantages for raising cattle and sheep are equal, the yearlong rate for sheep after the season of 1911 will be thirty per cent of the yearlong rate for cattle.

The new regulations have been made the subject of extended and most careful consideration, and are promulgated at the present time as the result of a general revision made of all the regulations governing the use of the national forests. Before deciding on the grazing regulations, Secretary Wilson invited representatives of the two national organizations of stockmen, the National Wool Growers' Association and the American National Live Stock Association, to present their views to him on grazing matters, and to make any suggestions which they might wish to offer concerning the proposed regulations. The proposed regulations, as they had been drafted by the Forest Service, were submitted to delegates of the two associations, who came to Washington in response to the Secretary's invitation. Secretary Wilson recognizes that the one and one-half million cattle and seven and one-half million sheep, which are annually grazed on the forests, bear an important relation to the price of beef and mutton in this country, and that the public need of increased food supplies no less than the best interests of the stock industry call for careful methods of regulation to promote the full use of the grazing resource.

Regulated grazing on the national forests seeks not only to make available, to the fullest degree consistent with proper protection of the range itself and of forest growth and streamflow conditions, the annual forage crop, but also to allot the grazing privilege equitably. By giving the stockmen themselves a chance to be heard with regard to the rules established, and by securing their help in the adjustment of disputes between claimants for use of the range, the department officials consider that the task of administering the range satisfactorily has been made much easier.

No radical changes in the regulations have been made. As a result of the conferences with the representatives of the stockmen's associations, a number of changes were made in the details concerning the conditions under which owners may surrender, transfer, or renew application for grazing privileges. Both the department and the stockmen are anxious to prevent speculation in grazing privileges, and suggestions for minor modifications of the rules, offered by the stockmen to this end, were readily accepted.

STATE WORK

Report of the Forest Commission of Maine

In his annual report Edgar E. Ring, forest commissioner of Maine, refers to the fire peril and to the lessons of the past season. Of the new Maine forest fire law, he says:

"The forest fire law enacted by the last Legislature was a long step toward the conservation of our forests by protecting them from fire. We know the principles of the law are correct because we have tried them out. The necessity of patrol is so generally admitted that it hardly needs mentioning. Putting out fires already started is better than letting them burn, but, as the real foundation of a protective system, it is about like lowering the lifeboat after the ship has struck. Patrol is better than fighting, because the incipient spark or camp fire can be extinguished before it becomes a forest fire that has to be fought. One patrolman can stop a hundred incipient fires cheaper than one hundred men can stop one large fire.

"Results in forest protection are most truly measured, not by the number of fires extinguished, but by the absence of fires at all.

"Another feature of the new law is that the small assessment upon the land owners makes it co-operative. Just as the individual cannot maintain a properly organized and equipped fire department to look after his city property as well alone as through joining with the community, neither can he do so in protecting forest property. If one patrolman can cover the land of several owners, it is unwise for each to hire a man. If a fire starts and threatens several tracts, it is better to share the expense of putting it out. The sale value of timberland in any region is increased by public knowledge that those interested there unite in supporting progressive protective methods.

"Again this law has been the means of compelling the non-resident owner, the small owner who is unable to employ any one alone, and the non-progressive owners who would otherwise do nothing, to contribute their share toward the general cost, and the public take far more kindly to the enforcement of fire laws by the state than to similar activity on the part of the individual owner, against whom a prejudice might exist.

"Our forest wealth is mainly community wealth. All the owner can get out of them is the stumpage value. The people get everything else. On every acre of land destroyed by fire the citizens of this state who are not land owners bear at least 75 per cent of the direct loss and sustain serious injury to their future safety and profits.

The forest district plan, recently provided for, by which the land owners of Aroostook, Franklin, Hancock, Oxford, Penobscot, Piscataquis, Somerset and Washington counties are annually assessed one and one-half mills (in 1909 and 1910, $63,945.44) for fire patrols, has the commissioner's hearty approval.

Concerning the fire patrol and lookout system, Mr. Ring says: "One of the first things attempted and carried out under the conditions made possible by creating the Maine Forestry District, was the enlargement of the patrol and lookout systems.

"Eight years ago when the first law was passed looking to the protection of Maine's forests a goodly number of fire wardens were appointed and so far as possible during the dry and dangerous periods the most exposed places were patrolled, but necessarily only a limited amount of such work could be done with an appropriation of only $10,000, which had to be devoted to extinguishment as well as prevention.

"Experience has taught all who have made a study of the protection of forests against fire that first in importance is the protection that can be gained by proper patrol. It has been the custom of the forest commissioner each spring to meet the land owners of the different sections of the state at some convenient and central point to talk over and plan the season's work. At the meeting held in 1909 after the passage of the Maine Forestry District act we made known our plans for extending the patrol system and such plans met with hearty approval of the land owners.

"An efficient corps of chief wardens were appointed, men being selected who were recommended by the land owners as being thoroughly familiar with the territory assigned to their care. Under the chiefs were placed enough men to cover the most exposed sections and there was not a township of wild land that was not included in the routes of the patrolmen. The waterways and roads most frequently traveled by rivermen and sportsmen were particularly well looked after as were the townships lying along the railroads.

"Of the amount appropriated in 1909 there was used in the patrol system alone, including amounts paid the chief and

deputy wardens the sum of $31,131.79, making more than one-half of the entire amount expended in 1909 going directly for patrol work and supervision of the same. In 1910 for the same class of service there has been expended up to November 1, $38,708.97. Included in the work of patrol and constant watch for fires there has been posted by these men over 20,000 danger-fire notices, printed largely in English, although when it seemed wise notices printed in French and Italian have been put up.

"Close touch with the men employed has been made possible by weekly reports returned to the department by the regular patrolmen.

"In case of fire of any proportion and causing the hiring of extra men the chief or deputy wardens in charge file reports containing the following facts: County and township in which fire occurred; time discovered and number of hours before it was entirely extinguished; direction of wind at the time; method employed in extinguishing same; cause of fire; area burned; estimated damage; names of men and hours employed and the total expense of extinguishing the fire; the report to be signed and sworn by the warden in charge and approved by the chief warden of the section in which the fire occurred."

According to the report fire losses in incorporated towns in 1909 amounted to $32,965, in unincorporated townships, $63,734. The loss from forest fires in incorporated towns in 1910 was $1,906 and in unincorporated townships $935. The year 1909, the first season under the Forestry District, the appropriation for prevention and extinguishment was about $64,000 and the selectmen of towns also worked under the new law making their municipalities liable for their negligence.

The forestry department has equipped its wardens with tools for fighting fires, which are distributed in convenient localities and are branded with the stamp of the district. The amount invested in this manner is $5,000. There are twenty-four lookout stations on the high elevations. The construction and equipment of these stations has cost $14,664.49 the past two years. In connection with these stations many lines of telephone have been constructed, bringing the most remote sections into quick communication with the chief warden and localities from which help can be easily secured.

By arrangement with E. C. Hirst, state forester of New Hampshire, a system of co-operation was entered into in 1910 whereby Maine gets the benefit of the Kearsarge Mountain station in Chatham, N. H. Other stations overlooking Maine forests are contemplated by New Hampshire. In return Maine wardens watch for fires in New Hampshire from the Aziscoos Mountain station in Lincoln plantation, Oxford county. A system of reversing telephone tolls distributes the expense equitably.

A Gift to Vermont

Vermont has just received a gift of 106 acres including the summit of Bromley Mountain in the township of Peru, elevation 3,260 feet, from Hon. M. J. Hapgood. Mr. Hapgood has long been interested in forestry, and in addition to this gift has placed his own holdings under the direction of the state forester.

Commissioner Conklin's Report in Pennsylvania

In his annual report Commissioner of Forestry Conklin of Pennsylvania says:

"It is the duty of a government to perpetuate itself, and in perpetuating itself there is a further duty to provide for the common welfare of its citizens. With these objects in view, it is wise for a state to see to it that every square foot of soil, the source of wealth, be made to produce its highest revenue. Whenever elements of production are allowed to be wasted, the whole moral fiber of those in connection with the waste is lowered and general dissatisfaction follows. The state in turn suffers from undesirable citizens, loss of industry, income, and at the same time, outlay for remedial measures and a host of economic conditions which can hardly be followed.

"There must be more co-operation on the part of the departments concerned, principally those of education, agriculture and forestry. School gardens, elementary agriculture, agricultural clubs, Arbor day and so on must be gotten into the schools. The school building should be the social centers of the communities and, if necessary, the government must send out social settlement workers. Agriculture and forestry must no longer be left out of county and local teachers' institutes, nor should a consideration of the schools and forestry be left out of farmers' institutes. There are no forestry institutes, but lectures, bulletins, sample plantings and all manner of assistance must be provided for. It behooves every member of our departments to make each appropriation reach as far as possible, but it is more important that results are obtained from what is done, and then the results themselves must and will speak for increased assistance from the legislature.

There have been added to the reserve area 17,000 acres, during the past year, making the total area of reserves now owned by the state 933,582 acres. There are thirty-nine trained foresters and eighty-

five rangers in charge of this large area, using every means available to develop it as rapidly as possible and to bring it up to the best economic production.

The Oregon Conservation Commission on Forests

Oregon has had a particularly able and clear-headed conservation commission. This body issued for 1910 a comprehensive and valuable report. The commission has recently resigned to relieve Governor West of any embarrassment, and because of the failure of an appropriation to carry on the commission's work. The Governor declares that the state is to have a conservation commission, and he may reappoint some or all of the old board—J. N. Teal, chairman; F. G. Young, secretary; J. B. Wilson, C. B. Watson, Frank J. Miller, J. N. Hart, J. C. Stevens. The section of the report of the commission devoted to forests deserves wide reading for its fair and temperate discussion of current forest problems of the Northwest. We print this section entire:

FORESTS.

Whether considered as a source of greatest direct revenue shared by all the people, or for their part in maintaining conditions favorable to the highest general development along all industrial and social line, Oregon's forests, next to land itself, are far her most important natural resources. No other represents equal potential wealth; any other could be spared with less injury to present and future prosperity.

We are supposed to have a fifth of the merchantable timber in the United States. Even at current prices it should bring us $5,000,000,000.00. This prodigious wealth is better than gold, for its production will employ an industrial army, afford market for our other commodities, and in every way tend to the development of a great prosperous commonwealth. Forest wealth is community wealth. Protection of forest industry is the best form of prosperity insurance a timbered state can buy.

Notwithstanding these facts, Oregon is far behind other timber states in forest protection and management. While other states with far less at stake, from Maine in the extreme east to Washington and California on either side of us, are continually improving their forest laws and appropriating more and more liberally to safeguard the community welfare. Oregon does practically nothing. With an excellent code of forest laws, as far as punitive and regulative provisions go, it provides no machinery for their enforcement.

The result is what might be expected. The Federal Government and private forest owners, where they are interested, do much to prevent and fight fires. But without state aid neither can enforce the laws that would prevent fires, and large areas do not even profit by even their handicapped effort. During the season just closed we have lost, by fire alone, timber which if saved for manufacture would have brought $23,000,000.00 into Oregon. Other property worth many thousands of dollars has been lost by settlers who could ill afford it, many human lives have been sacrificed, and untold though usually unrealized injury has been done to the thousands of acres of second growth which otherwise would have made the forest of the future. Little or no progress in reforestation to retrieve this injury is possible under existing conditions.

All of it is unnecessary, for forest destruction is preventable. The state is directly responsible. Its responsibility and the remedy which lies in its hands are set forth in the following pages.

OUR FOREST RESOURCES.

While an accurate census is still lacking, authorities generally agree that Oregon has approximately four hundred billion feet, B.M. of merchantable timber. This estimate is probably conservative, for standards of merchantability become less exacting and vast quantities of wood material now unconsidered will have future value. The government estimates that about one hundred and thirty-five billion, or approximately a third of the total, is in national forests. The other two-thirds, the most valuable and accessible, are mostly in private hands. The state itself owns comparatively little timber, having disposed of most of its educational grant lands.

Board foot figures, however, fail to convey any adequate idea of the tremendous economic importance of this resource. We are further prevented from realizing it because its exploitation has scarcely commenced. We regard our forests largely as a wilderness, or at most as a speculative asset for their owners, instead of computing their function in the early future as producers of community wealth. But the world's demand for timber must inevitably lead to the manufacture and shipment of most of this material within the next fifty years, thus bringing billions of dollars into Oregon. For this reason probably no other resources can approach our forests in distributing new wealth per capita among our population and consequently in upbuilding every industry we have, or may hope to have in any portion of the state.

Without counting increasing export to other countries, the United States already uses (1908) 40,000,000,000 feet of lumber a year, besides 118,000,000 hewn ties, 1,500,000,000 staves, over 133,000,000 sets of heading, nearly 500,000,000 barrel hoops, 3,000,000 cords of native pulp wood, 165,000,000

cubic feet of mine timbers, 1,250,000 cords of wood for distillation, and 90,000,000 cords of fire wood. One by one the timber states, which have met this enormous drain, are becoming exhausted. Washington nows bears the heaviest burden, but Oregon will soon be called upon.

But, while Oregon's stock of four hundred billion is almost incalculably valuable in the light of these figures, it is scarcely more so than our immense area of cut and burned over land. Upon our management of this depends whether we shall continue the period of prosperity permanently. Here again accurate figures are lacking, but it is probable that an area quarter as great as that now bearing merchantable forest is capable of equal production in the comparatively early future. This fact, practically ignored, is of the utmost importance.

Nowhere else is forest reproduction as rapid and certain as in the Pacific Northwest. The same natural influences which made our existing forests the most magnificent in the world will perpetuate them with equal success if given slight co-operation by man; indeed they ask little help but prevention of fire. Saw timber can be grown in 40 to 60 years; ties, timbers and piles in less. It is reasonable to suppose that while the quality may be inferior to that of the old forest being used now, timber scarcity will make a second crop equally profitable per acre in 60 years. Our deforested land of today should bring us in a billion dollars within the lifetime of our boys and girls, if we do not deliberately destroy its capability to do so.

RELATION OF FORESTS TO THE AVERAGE CITIZEN.

The Oregon lumber industry nows brings about $25,000,000 a year into the State; as much as our apples, fish, wool, and wheat together. In a year or two our forest revenue should certainly equal or surpass that of Washington, already over $75,000,000. Eighty per cent of this immense sum goes to pay for labor and supplies. Practically all finds its way into general circulation. The lumber industry is like any branch of manufacturing in that it creates business, and more than most it consists of labor and so supports every industry of the community. The money brought into Oregon by lumbering is the greatest source of revenue to laborer, farmer, merchant, and professional man. As the product is mostly sold elsewhere, this revenue is clear gain to the state. Forest products constitute eighty per cent of the freight shipped out of Oregon.

The interest of the average citizen in forest protection and use is affected very little by the passage of title to forest land. The owner gets only the stumpage, which is a small part of the value. The people get everything else. Moreover, the people of Oregon are also consumers of forest products. Waste of existing forest, or failure to produce new forests, adds inevitably to the price they must pay, besides reducing the per capita wealth with which to pay it. And the price of almost every other commodity we use is affected by the cost of forest material used directly or indirectly in its manufacture and marketing.

It is unnecessary here to point out the relation of forests to stream flow and the imperative necessity of protecting our agriculture and water power industries from alternating flood and failure. Less commonly considered is the intimate relation to every citizen, the farmer especially, of forests as a source of tax revenue. This form of property is one of the chief contributors to the support of local and State government. Every acre of timber destroyed, or failing to grow where it might grow, adds to the tax burden of the holders of other property. Were all Oregon's timber to be destroyed, this burden would suddenly be augmented. Partial destruction has precisely the same effect in corresponding degree and so does failure to reforest.

Oregon's forests are the assests of all its citizens. The lumberman or timber owner is, economically, only their agent in using them. The lumberman can change or move his business, but the people as a whole have a stake in forest preservation that is unalienable and paramount. Their prosperity depends upon it now and always. The question involved is not one of personal property, but one of a community resource.

PRESENT WASTE.

Blinded by the fallacy that it is the timber owner who pays, we let nearly one and three-quarters billion feet of timber burn this year without having taken any steps to prevent it. If saved for manufacture this would have brought at least $23,000,000 into Oregon, or over $30 for every man, woman and child in the state. This sum would pay the entire cost of state government for nearly ten years. It would pay every dollar of state and county tax together in Oregon with money to spare for improvements. The interest on it at only one per cent for one year, if spent for systematic protection, would have prevented the loss.

In addition to the loss of merchantable timber six human lives were sacrificed and the destruction of buildings and improvements amounted to many thousands of dollars. Property losses by citizens, in no way connected with the timber industry, were many times what it would have cost to prevent these fires. Thousands of acres of cutover lands were also burned over.

destroying all reproduction and seed trees.

Only a fortunate break in weather conditions prevented an even more serious catastrophe. All available agencies were taxed to the utmost fighting fires already under way, and had rain not come when it did countless others would have passed beyond control. Oregon's escape from one of the most fearful forest fires of history was not due to its own precaution.

Nor, after all, was the season of 1910 so unusual as to be reassuring as to the future. Seasons vary, and Oregon has no adequate system of reporting fire damage, but competent authorities estimate that the average annual loss in the past has been fully half a billion feet and probably more. This means an annual loss to the community of six or seven million dollars at least.

Second, only to the fire loss, as a result of Oregon's apathy toward forest preservation, is its unfavorable affect upon reforestation. To the careless waste of existing resources which we and our families should share, we add the idleness of all the land cut and burned over each year, a dead loss of many millions of dollars. Fear of fire and discouraging taxation justly warrants the owner in not taking the necessary steps to make this land useful, hence much of it reburns and turns into desert, ultimately to be untaxable, non-productive, and offering no reward to labor.

Milling and logging waste constitute another leak in our forest economy and will persist as long as neither state nor public show any recognition of fundamental principles. So long as our lumbermen must bear the entire burden of forest preservation and still compete with those of other states where the community assists, they can do only what it pays to do.

EXISTING PROTECTIVE EFFORT.

The federal Forest Service is the only public agency doing anything to take care of the Oregon forests. Its expenditures for protection alone in 1910 will exceed $200,000. Of this approximately half is for patrol and half for trail and telephone building and additional fire fighting labor. The U. S. Army and the Oregon National Guard also gave valuable assistance during the August fires, but this was an unprecedented emergency action and can hardly be considered in discussing Oregon's protective system. Ordinarily the Forest Service confines its work to the national forests, but this year the menace to homes and property outside led it to disregard official boundaries in many instances. In either case the benefit accrues to the state for national forest timber is a state asset in all but stumpage returns and twenty-five per cent of these also are paid to the counties. As adequately as congressional appropriations permit, the Forest Service takes care of about a third of the timber in the state. It has also begun reforestation.

The only fire protection is that given by private timber owners. Through individual and co-operative patrols they spent about $50,000 in 1909 and, while reports for 1910 have not been prepared, presumably that amount was doubled or trebled this year. About 290 regular patrolmen and over 1,000 extra fire fighters were employed. The Coos County Fire Patrol Association and the Klamath Lake Counties Forest Fire Association are strongly organized co-operative patrols in which the members pro rate the cost upon their acreage. The Northwest Oregon, North Williamette, Lincoln-Benton and Polk-Yamhill Forest Fire Associations are looser alliances of timber owners maintaining individual or informally co-operative patrols. For central effort in increasing the extent and efficiency of patrol, all these organizations combine in the Oregon Forest Fire Association, which in turn is affiliated with the Western Forestry and Conservation Association embracing all similar organizations from Montana to California. These private patrols have been of immense value to the State. It is notable that where they were best organized, losses this year were insignificant. They vary in efficiency, however, and do not cover sufficient area.

The Oregon Conservation Association represents a purely public spirited reform movement, supported by annual dues from all classes of citizens, and not particularly pledged to promote forest protection more than that of other resources. So far it has devoted itself chiefly to this end, however, in the belief that no other problem is equally urgent. Its chief function has been to supply means for carrying on the work of the State Board of Forestry, which is unprovided for by the state itself. By meeting expenses for postage and clerical work, and allowing its secretary to act as secretary of the state board in preparing publicity matter concerning the fire evil, appointing and aiding voluntary State fire wardens, collecting statistics, etc., it alone has prevented the forest laws from being absolutely inoperative. It is hardly likely, however, that it can continue this work indefinitely, in view of the claims of its members interested in other lines of conservation. The Western Forestry and Conservation Association, mentioned on a preceding page, is even more active in propaganda work seeking to interest both general public and forest owners in systematic forest protection.

The State Board of Forestry, created in 1907 by a statute that also provided an excellent forest code, remains practically powerless because it is not supplied with any machinery for active work. It is thus shorn of any real function except to make recommendations to the legis-

lature and has not the means of collecting information to make these effective. Its appropriation in only $250 a year. This insignificant sum is Oregon's total contribution, as a state, to the cause of forest preservation. It is the least appropriated by any state in the Union that has any forest system at all.

The statute referred to (Chapter 131, Session Laws of 1907) has three excellent features. In the principle of a non-political Board of Forestry, composed mainly of representatives of agencies, competent to deal with forest matters, it follows the example of most progressive states. By enabling the authorization of voluntary fire wardens to control the use of fire in the dry season, it provides the only safeguard practicable without actual state aid. Its regulative and punitive sections, or "fire laws," are well drawn as far as they do. On the other hand, it is only framework, lacking the life to make it really effective. It provides for no educational work to create the necessary public undertaking of the subject, no means of investigating forest conditions, no means of enforcing the fire laws, no machinery for actual forest protection, and above all, no head to develop and execute any State forest policy. In effect it amounts to giving in legal language the state's gracious permission to its forests to take care of themselves. This authority is of considerable use, for without it still less would be accomplished, but it is only the first step toward meeting a situation in which the state's welfare is vitally concerned and in which the state is primarily and unaviodably responsible.

That the state's present policy, or rather lack of policy, is hopelessly inadequate may be seen in the following counts:

1. There is no one to enforce the fire laws. Every other law to protect life and property has its provided officers. The fire laws do not lend themselves well to the ordinary established machinery, but are not for that reason any less entitled to respect. There is no moral or economic difference between firing a forest and firing a city, yet to violate one excites horror and leads to the pentitentiary, while conviction, or even prosecution, for the other is almost unknown. If detection is more difficult, there is all the more reason for providing for it. This is a police function and only the state can exercise it. The employee of an individual or corporation can patrol or fight fire, but he cannot successfully exert police power or prosecute. At present violation of the fire laws is the rule. The violator cannot be expected to take in earnest a law which the state itself does not recognize. With the laws enforced, few fires would start.

2. There is no means of stopping fires that do start. Forest protection is left absolutely to the enterprise, judgment and financial responsibility of anyone or no one. To the extent that he believes it pays him to do so and where he believes it pays him to do so, the forest owner will do his part. But this is exactly like not policing a city in the hope that some individual will be willing and able to do it to our satisfaction. And the result corresponds. Those who can least afford to lose receive least protection.

3. There is no means of helping the progressive timber owners to secure the cooperation of their unprogressive brothers. Probably the greatest retarder of efficient private organization which would otherwise reduce the need of state financial aid to the minimum is the failure of the unrepresentative minority owners to bear their share.

4. There is no one to educate the public in the need of forest preservation. So long as this work is left to private effort it is not only uncertain in quantity and persistence, but accomplishes the minimum result because suspected of selfish motive. By not recognizing this need, the state in effect declares it non-existent and advocates forest waste.

5. There is no one to study and promulgate improved methods of protection, management and reforestation. Even the interest in forestry, which is growing, without propaganda is unable to get the technical information and assistance necessary to secure actual practice.

6. There is no progress toward a solution of the forest taxation problem, especially as regards cut-over lands, without which there will be continual dissatisfaction on all sides and small progress toward reforestation.

7. Above all, there is no agency with facilities and technical competence to develop, to say nothing of executing, a rational far-seeing forest policy for the state which needs this more than any in the Union.

To sum up, although Oregon is trying to bring about wise use of its fish, its game, and its agricultural resources, and spends money to this end, it absolutely neglects its most vulnerable resource—its forests.

WHAT IS NEEDED AT ONCE.

On the other hand, it needs no theory to outline a remedy. We have only to look at experience elsewhere. Where there is an adequate fire service the losses are reduced by a hundred times its cost and few fires are set. Where there is someone to study and report conditions, the laws are constantly improved. Where good laws are strictly but intelligently enforced, the people respect and endorse them. Where the lumberman can get competent advice and encouragement, he is quick to see that both protection and reforestation are profitable. The essentials of such a policy for

Oregon are cheap and simple. They are as follows and should be provided for without delay.

1. A trained state forester familiar with western conditions and experienced in organization for the prevention of forest fires. He should not be a cheap man, but the best available, and chosen absolutely independently of politics. He should be allowed to appoint one or more assistants.

2. A liberal appropriation for forest fire patrol, with ample latitude for such co-operation with other agencies as the state forester shall find for the best interest of the public, especially through the encouragement of further extension and efficiency of private and county effort.

3. Improvement and strict enforcement of laws against fire, the state to exert its police authority to this end.

4. Systematic study of forest conditions and needs, to afford basis of intelligent action and of any further desirable legislation.

5. A system of general popular education, with specific advice to individuals in proper forest management.

The following are equally important as part of an early rational policy but perhaps less urgently in need of immediate action by the legislature:

1. Dependable low taxation of deforested land not more valuable for agriculture which will encourage its being held and protected for a future crop, the state to be compensated by adequate tax upon the yield.

2. Thorough study of the subject of taxing mature timber, with a view of securing the adoption of a system which will result in the greatest permanent community good.

3. Study on which to base the early application of advanced forestry principles to the management of state-owned forest lands, and the purchase of cut or burned over lands better suited for state than private forestry. This to furnish educative example as well as to maintain state revenue and proper forest conditions.

LESSONS FROM OTHER STATES.

Hardly any two states have exactly the same policy in fire prevention. But, barring, of course, those which do practically nothing and consequently cannot be considered to have studied the subject, the greatest divergence is in the manner of making the work a public charge after admitting that it should be one. In other words, progressive states recognize that it is a public function and seek to make the general population share the cost, but their customs of local government influence decision as to whether state, county or township should collect and expend the funds which are borne by the taxpayer in either case. This is largely a question of constitutional power to lay burdens upon local units against their will.

Pennsylvania, which in all forestry work makes the state chiefly responsible, bears four-fifths the entire expense by direct appropriation. The counties pay the other fifth. Michigan pays one-third, Connecticut one-fourth. The majority of eastern states, however, share costs equally with the town governments which exist there. Vermont solves the problem by assuming it should be a town charge but preventing hardship upon poor towns by providing that any expense in excess of five per cent of the town's "grand list" shall be borne by the state. In 1908 this worked out to make 70 towns with small fires pay their own bills, while in 20 towns, severely ravaged, the state bore two-thirds the expense, of fire fighting at a cost to it of $6,000. Some states, including Massachusetts and Wisconsin, make the towns bear all fire expense except on state reserves. Maine places a special one and one-half mill tax on all property in (not timber land alone) the forest portion of the state, and the state collects and spends it. As a rule eastern and central states do not consider private protection by the owner any more logical than private fire protection in cities. To put it another way, they assume the forest tax payer entitled to the same protection under the forest statutes that he or any other citizen receives under the statutes against murder, theft or arson. The question is only whether state or local government shall finance and provide it, by direct appropriation or otherwise.

Oregon conditions are different in many ways. The people's interest in forest protection is in no way decreased by the existence of larger individual holdings, for the use of timber brings the same wealth for distribution and its destruction equally injures all industries. Indeed the public's stake is greater in exactly the measure that forests constitute a greater proportion of our total resources. Nevertheless, the system of production must be modified to fit our constitution, our distribution of wealth and population and our less advanced public sentiment in the matter. Axiomatically, Oregon should spend as much more money than Pennsylvania, as it has more forest values to protect, but spend it differently.

No project, in which the public does not share, receives public support. So long as forest preservation is by the lumber industry alone, it is looked at as a measure of private profit only. Carelessness and lawlessness cannot be prevented or prosecuted, for public sentiment is not with the property owner. But, when the average citizen is made to pay something to protect his own welfare, he wants results for his money, even if he does not approve of paying it. He sees that de-

crease of fire hazard decreases his share of the expense.

Town or county responsibility for actually performing work cannot be relied on at our present stage of popular education. Politics, inexperience, apathy, are twenty times as hard to overcome in twenty units of government as they are in one. Theoretically, the nearer the administration is to the thing administered the better, but this is true only when equal competency and interest exists. This is borne out by results where the experiment has been tried, as in California. There the law authorizes counties to appropriate for fire prevention, but they do almost nothing. The only way this plan could be made effective is by compelling the counties to act.

Our wealth, population, and dependent industries which should help pay for forest protection are largely outside of the forest itself, not scattered through it as in many eastern states. Only by state distribution can the cost be fairly equalized.

It is unlikely that our voters would consent, as they do in many states, to relieving the timber owner entirely of the burden of protecting his property. Nor is it necessary that they should. A strictly official system, in which only office holders spend only public funds, seldom if ever has the maximum efficiency until removed from politics, and this is hard to accomplish until its object is so thoroughly approved and understood by the public that no trifling is permitted. Self-interest must be appealed to in order to insure sincerity and, until the public fully realizes its own self-interest that of the timber owner must be utilized.

The timber owner and lumberman himself, by no means always wholly above education, must also abide by the operation of the law. He will support it better if he has a part in it than if he regards it solely as officially restriction of his liberties.

For these reasons, the most practical system for western applications is one which—

(*a*) Places a fair share of the financial burden on the timber owner;

(*b*) Leaves execution with him insofar as his self-interest and technical competence tends to secure economy and efficiency;

(*c*) Assists him to make less willing owners do their part:

(*d*) Makes the state bear enough of the financial burden to discharge its obligation, enlist public support, and insure adequate protection;

(*e*) Gives enough supervision to insure honest execution and enough backing to enforce the law.

(*f*) Provides for education and sentiment-molding that cannot be charged with selfish motives.

There are two ways to carry out this policy. One is to enact a detailed law which attempts to govern the co-operation between state and private effort so specifically that neither can secure undue advantage. This assumes that both will try to. The other way is to take every precaution to get a competent non-political state forester and leave him as free as possible to deal with the matter. The latter is by all means preferable. By its very nature, and also by reason of its infancy, forest work is insusceptible of accurate forecast of detail. It may vary from year to year, from place to place. While the state's attitude may be fixed by legislation, that of the agencies it must co-operate with must be developed; and not by legislatures, but by the officials with whom they deal. A cumbersome or inflexible law prevents progress of any kind. A flexible law permits experiment and progress, which may be excellent. While it also permits abuse, this may always be stopped before much harm is done, because only one appropriation is involved.

State funds for forest work may be raised by direct appropriation or by a special tax. The latter seldom can, or should, be imposed until a thoroughly satisfactory administrative system is established. We should first get a competent forester to work out a permanent, financial policy, and present it to a later legislature for adoption. Until this is done, liberal direct appropriation is probably all that is safe.

The amount of this appropriation should have an actual basis, governed by the acreage and value of the state's forest resources and the risk to which they are subject. The state's participation is merely paying insurance to protect its prosperity. Every thousand feet of timber saved for manufacture and sale means the distribution of from $10 upwards among its population. Every thousand feet destroyed means an equal loss. The interest alone on the annual loss by Oregon would pay many times the entire cost preventing it. Not to insure against this loss is folly.

There should, however, be some way of inducing forest owners as a class to live up to the policy adopted by the state. While it should be possible to meet emergencies anywhere that public welfare so demands, as a general policy state funds should go to help districts that help themselves, thus acting as a lever to encourage private and county efforts. This also fits the plan of placing the actual fire work in the timberman's hands to ensure efficiency. Again, it is obvious that where the most private money is spent is where large fires must be fought, and as large

fires mean property destruction also, the private cost is now borne by those whose losses make them least able to bear it.

Here we arrive at a distinction between patrol and fire fighting, and it is in this that most eastern systems are weak. They tend to provide for fire fighting or for prevention, and consequently cost more than they need to, with less actual protection. The ideal is to assist patrol, as well as fighting, in equal proportion of the cost, and this can scarcely be done without close co-operation between state and owner without a districting system determined chiefly by owners. Prevention, not fire fighting, is the end to be sought. It depends, in cost and efficiency, upon local hazard and ownership.

Any state falls into a greater or less number of districts demanding different measure and method of patrol best determined by those interested therein. The owner of the majority of the forest property in each should have chief voice in fixing the cost and method essential, all owners within this district should bear equal proportionate burden, and the state's proportion should bear the same relation to the acreage cost that it does in any other district. Like division should be possible for cost of fire fighting labor additional to patrol.

The most practicable solution of these many problems, at least at present, seems to be to modify the present Idaho district system so as to escape its regulation of state expenditure solely by state ownership, which is not adequate in Oregon. Wherever the owners in a suitable district will make concerted effort, the state should agree to bear a certain proportion of the cost provided there is a responsibe local organization to carry out the protective policy decided upon. In localities where the owners refuse or neglect to maintain such organization, independently employed wardens should be appointed upon request, but without compensation by the state, as at present. In such localities, also, the state forester should be empowered to take any additional steps demanded by the public welfare in emergency, and perhaps to recover a fair part of the cost from the owners of the land concerned.

To sum up, although the state's interest and financial responsibility is great, it can accomplish most not by building up an immense fire organization of its own, inviting political interference and at best requiring complicated and expensive supervision, but by encouraging and aiding local action by those whose own interest insures the maximum efficiency with the least state machinery. Where it cannot obtain this relief, and only there, it should take charge of the situation itself. If this system is followed, the expenditure of the state fire funds will be to best advantage, and the state's own forest service will be left fairly free to devote itself to other branches of forestry work, such as reforestation, public education, and making the many investigations badly needed before a permanent policy can be developed. Otherwise the state forester's entire time is occupied by fire work, which can do no better than others, and he has no opportunity to do the things which he alone can do.

Pennsylvania spends $180,000 a year for forestry and fire protection, New York $118,000, Maine $64,000, and the other eastern and middle western forest states follow in line. Michigan expects to treble its present annual appropriation of $19,000 this year. Minnesota appropriates $21,000 and the towns bear the rest. Washington expects greatly to increase its present annual allowance of $23,000. Idaho shares on a pro rata basis, amounting to about $15,000 last year and double that this year. It is unnecessary to prolong the review further than to say that down even to little New Jersey, with $13,500 a year, other states have left Oregon at the foot of the list in preservation of forest wealth and industries. None of them, having begun the work, abandons it. Their people endorse further progress by each legislature. Shall Oregon, with most at stake, remain the only laggard, inexcusably indifferent to the life and property of its citizens, and hazard worse disasters than those of 1910.

NEWS AND NOTES

Consumption of Tanning Materials

Tan bark and tanning extracts were consumed in the United States during the calendar year 1909 to the value of $21,904,927, as against $21,361,719 in 1908 and $21,205,547 in 1907. Of these totals the outlay for extracts formed 49.2 per cent during 1909, 49.4 per cent in 1908, and 45.5 per cent in 1907.

While the total expenditure for vegetable tanning materials has been divided between the group of barks, etc., on the one hand and that of extracts on the other during the past three years, the average cost per cord of barks has advanced steadily from $9.52 in 1907 to $9.58 in 1908 and $10.31 in 1909. This increase in the average cost per cord has been accompanied or followed by a corresponding decrease in the quantity annually consumed during the same period, the total for 1908 being 7.2 per cent less than that for 1907, and that for 1909, 4.3 per cent less than that for 1908. The most marked decrease in annual consumption is shown for hemlock, which was the bark used in greatest quantity in all three years, the reported total of this species for 1909 being less than that for 1908 by 13.8 per cent, and less than that for 1907 by 14.4 per cent.

The showing for extracts is similar to that for barks, etc., with respect to cost, though entirely different when the annual consumption is considered. The average cost per pound of extracts of all kinds consumed during 1907 was $0.0264, while in 1908 it was $0.0269 and in 1909 $0.0278. The total consumption in 1909 was greater than that in 1907 by 21,918,360 pounds, or 6 per cent, though slightly less than that reported for 1908, the total for which year was the largest of which there is record.

The most marked increase among the leading extracts was in chestnut extract, the consumption of which in 1909 exceeded that of 1908 by 24.5 per cent and that of 1907 by 35.6 per cent. This movement in the tanning industry toward the supplanting of barks as materials with extracts has been discernible in the showings for several years past and follows logically the growing scarcity and rapidly increasing cost of the barks. Furthermore the fact that the supply of barks is not only diminishing but at the same time becoming more remote from transportation facilities contributes to the decreasing use of tanning materials in this form.

The tanning industry, or that portion of it using vegetable tanning materials, is widely distributed. The consumption of extracts was reported from 33 states, and of barks from 25 in 1909, but the four states of Pennsylvania, Wisconsin, West Virginia, and Michigan, ranked in point of consumption in the order named, used nearly two-thirds of the total quantity of barks reported, and, with Massachusetts, about three-fifths of that of extract. Pennsylvania continues, however, to be far in the lead of all other states in the quantity of both barks and extracts annually consumed, this state alone reporting 28.8 per cent of the barks and 32.2 per cent of the extracts used during 1909.

The Southern Appalachian Rivers

A detailed report upon the surface water supply of the south Atlantic coast and the eastern part of the Gulf of Mexico is contained in Part II of a series of government reports entitled "Surface water supply of the United States, 1909." This paper is published by the United States Geological Survey as Water-Supply Paper 262 and may be obtained from the Director of the Survey on application. It will be of particular interest in connection with the protection of streams by national forests under the new law.

Determinations of rates of water flow are of importance in leading to the most complete utilization of the power of a stream. At any reasonable valuation per horse power, the undeveloped power of these streams is an important industrial asset. In Georgia and the Carolinas, more than 100,000 horsepower has been developed and is being used by the cotton mills alone, and public service corporations in these three states are to-day developing 300,000 to 400,000 additional horsepower to turn the hundreds of mills and light the many towns and cities in the region. In the operation of the power plants already constructed and in the financing and building of those yet to be developed the problem of water flow is an important factor.

Projects for providing water for domestic supply, for irrigation, and for generation of power for factories can not be designed intelligently without a knowledge of the flow and the behavior of the rivers from which the supply is to be derived.

Methods of taking records and of computing rates of flow are described in detail

in the paper. The instruments employed are illustrated, and the manner in which they are used is shown.

Among the river basins considered are those of the James, Yadkin, Santee, Savannah, Altamaha, Appalachicola, Choctawhatchee, Mobile, and Pearl, with their most important tributaries. A summary showing the great divergencies in seasonal rates of flow exhibited by these streams is appended to the text.

A Canadian View

A very interesting letter has recently appeared from Senator W. C. Edwards, president of the Canadian Forestry Association, in favor of the reciprocity agreement. Coming from one of the leading lumber operators, timberland owners, and paper mill men in Canada, this letter contains some statements that are well worth noting. Among other things, Mr. Edwards says:

"Amongst the questions that attract more or less attention in the discussion going on at present in Parliament is that of the capturing and despoiling by the Americans of our natural resources. Our principal natural resources, so far as I am aware, are the products of the farm, the forests, the mines and fisheries, and of these, where the most fear is apprehended, are our forest products, say lumber and perhaps more particularly pulp wood; there are, in the minds of very many of our people, some very mistaken ideas with regard to this subject.

"In the minds of many Canadians the Americans have practically exhausted their forest resources, and are in immediate need of securing their requirements from Canada. This is not true. The United States possess to-day vastly more lumber than Canada and cutting as they are, say 40 billion feet per annum, they are said to have sufficient to supply their wants for from twenty-five to thirty years. Just where she is to look for her supply after that time I have no idea. Most people think Canada will then be her source of supply, but this is an error. For while it is true that up to date no approximately accurate estimate has been made of our timber resources, yet quite enough is ascertained to make it well known that the total timber resources of Canada suitable for lumber for immediate cutting would not supply the United States for more than eight or ten years.

"As far as pulp wood is concerned the situation is different. Our resources in spruce, suitable for pulp making, are very much greater than theirs, and again the total quantity required annually for paper making is quite a small item compared with the quantity of lumber consumed.

"What the position of the United States is to be 20 to 30 years hence in her lumber requirements is a great and important question, and one which is in their hands to solve.

"But the important question engaging the minds of some Canadians at the moment is that should the duty on Canadian lumber entering the United States be abolished, and that should the further provision take place, viz., that for the free entry of Canadian pulp and paper into the United States, the provinces relax their regulations that pulp wood cut from the crown domain shall be manufactured in Canada, that what will follow will be greatly increased exhaustion of our forests consequent on improved prices for our lumber and the sale of our pulp wood to the United States, and I at once admit that this is a most reasonable deduction to arrive at on the part of those unfamiliar with the true situation.

"The agitation against the exportation of pulp wood first arose on the part of the pulp and paper makers of Canada, with the view of circumscribing the market for their own selfish ends; but misguided and uninformed patriotism has now carried them away."

Continuing, he refers to the removal of the duty on lumber, and says it will not stimulate lumber production, but will let the Canadians penetrate a little further into the United States.

Then he continues "It cannot be attributed to me that I have any selfish ends to serve in what I suggest, as I am a protective pulp and paper maker and have never exported pulp wood and never expect to, and that my firm conviction is that the free admission of our lumber into the United States will not have the effect of increasing Canadian products, and that the removal of the manufacturing provision of the provinces, as applied to pulp wood, will do Canada incalculable good and no harm whatever.

"My frank opinion is that by far the greater benefit to be realized by Canadian lumbermen will be from the general improved conditions Canada will most certainly enjoy if the suggested lowering of tariffs on both sides of the line takes place. This, I believe, will be far and beyond the most sanguine expectations of the promoters and supporters of the proposition. And now as to pulp wood, I affirm that forest conservation is a matter by itself, and stands on its own bottom. The crown, represented by the various provinces, enacts the regulations and through such regulations controls the cutting. The matter of forest conservation is not involved in dictating to the limit holder the form in which he shall sell his product.

"Many of the United States mills have abundant supplies of pulp wood for many years to come. This is true of many of the Eastern mills, and in the West there is an enormous supply. In Oregon and Washington the pulp mills are cutting the largest and finest spruce, capable of making the longest and largest of dimension timber, into pulp wood for their immediate and prospective wants, and for a few years back have been buying some pulp wood in Canada, cut almost entirely on private lands, and the cheap price of Scandinavian pulp enables them to import from there. But many of these mills suffer another and most serious disability, viz., a shortage of water for grinding the wood, and this shortage is becoming more intense as time advances. There is the further condition that many of the American mills, and particularly those who have but a limited supply of wood ahead of them, are but temporary, and one by one will go out of existence.

"With our very large resources in pulp wood and our numerous and never failing water powers, particularly in the province of Quebec, there is but one sequence to this question. The ultimate destiny of a large share of the pulp and paper making of North America will be in Canada. But this result will come automatically and by evolution. Mills will gradually disappear in the United States, and excepting in places where there is a future supply of wood no new mills will be built there, and as fast as market demands their construction they will be built in Canada; but the construction in Canada will not be hastened one day by the provincial restriction existing, but otherwise. It will be retarded just as long as the maintenance of the American duty remains a consequent provision, and Canada will be most seriously injured. Freedom of entry into the United States for pulp and paper would encourage the construction of mills in Canada, but the reverse will deter judicious Canadians from so investing.

"That it is wiser that the transference of that large part of pulp and paper making that is to come to us should come fairly gradually, I personally feel no doubt of, and if the American market is open to us I am certain that the paper making will come to us as well as that of pulp, for apart from the transportation condition so favorable and advantageous to paper over pulp, there is the water power question I have mentioned, which is very essential.

"And in the meantime, as this automatic transference goes on, a rich harvest can be obtained by those who have spruce which they wish to dispose of, as the Americans who need the pulp wood will pay during the lifetime of their mills, a high price for it, and earn even small dividends on their properties rather than no dividends."

A Gift to the Yale Forest School

The gift of $100,000 for a building for the Yale Forest School is announced. The name of the donor is not made public. The building will be erected upon the Pierson-Sage square. Following so closely upon the gift of $100,000 by Mrs. E. H. Harriman, to endow the chair of forest management, in memory of her husband, this indicates the interest which those of large means are beginning to take in forestry, and the recognition of the profession, and the need of thorough training therefor.

Conservation in Hawaii

On Wednesday afternoon, November 16, 1910, there was held in Honolulu, Hawaii, a public meeting to consider the local application of the five cardinal points of conservation—the right use of lands, waters, forests and minerals, and the safeguarding of public health. It was under the joint auspices of the Territorial Board of Agriculture and Forestry and the Hawaiian Sugar Planters' Association. In the audience were a majority of the sugar plantation managers and other members of that association, but in addition there was also present a goodly company of persons representative of the best thought and influence in the territory in other lines. Short addresses were made by Governor Frear, Messrs. Marston Campbell, Ralph S. Hosmer, Dr. E. V. Wilcox, Hon. W. O. Smith, Dr. W. C. Hobdy, Prof. C. H. Hitchcock, and Mr. Alonzo Gartley on various phases of the conservation problem in its local aspects.

In the speaking, mention was made of important co-operative work by the territorial bureaus, the United States Forest Service, and the United States Geological Survey. Ralph S. Hosmer, superintendent of forestry of the territory, spoke on the part played by the forest in conservation. He summed up the importance of forestry to Hawaii in these sentences: "In Hawaii forestry is a business necessity. Wood and water are the first needs that must be satisfied in any community. Both are products of the forest. Wherever it can be got water is the most valuable product that the native Hawaiian forest can be made to yield. In Hawaii, without the native forest we should be without water. And in our planted forests, we have, too, an asset constantly increasing in value; for the production of wood is one of the pressing needs of local conservation."

To Get In Under the New Law

It has just been discovered that Kentucky alone of the Appalachian states has not passed a law permitting the United States to hold land within the state under the new national forest law. Unless this is promptly remedied, therefore, the Blue Grass State will have to be left out of consideration for the present. As the Kentucky delegation in the House of Representatives cast five votes against the Weeks bill and none for it, and one of her senators voted against it, this seems a little like poetic justice, but it is rather hard on Representative Stanley, who worked for the bill long and consistently in the Committee on Agriculture, and would have been present to vote for it but for illness.

In this connection it is interesting to note that a bill to authorize the national government to establish forest reserves in Pennsylvania has been introduced in the legislature of that state. It is said to be part of the general plan of the flood commission for putting a stop to the periodical flood loss in Pittsburgh. Federal, state, county and city government are expected to co-operate in the carrying out of measures which will eventually be the means of impounding flood waters at their sources and using them during dry seasons.

Hardy Catalpas for Iowa

That the hardy catalpa is one of the best fence post trees that can be grown in Iowa, is the conclusion reached by the Iowa Experiment Station. Eighteen-year-old trees that have been properly cared for will yield from 2,000 to 2,500 posts to the acre. The gross annual return per acre per year on the Iowa plantations studied varied from $10.77 to $20.34. Copies of Bulletin 120, giving directions for growing catalpas, can be obtained free by writing to the Iowa Experiment Station at Ames.

Publications of the United States Geological Survey

A new list of publications of the United States Geological Survey, just issued, contains the titles of more than a thousand books and pamphlets. These reports cover a wide range of subjects. They include not only papers on geology and topography but reports on water resources and on technology. The Geological Survey was the nursery of the United States Reclamation Service and the Bureau of Mines, which now, in full growth, are carrying along successfully work begun by the Survey years ago. The Survey, however, still continues its work on water resources and includes discussions of technology in its annual volume "Mineral Resources of the United States."

A glance at this list will show the great diversity of the subjects considered and the manifold nature of the science of geology. The reports include discussions of geologic chemistry, mineralogy, petrography, and paleontology, as well as ore deposition and other matters of very practical importance. Much of the Survey's late work has been directed to the study of mineral deposits of economic value. The work done in land classification has not yet found detailed expression in the Survey's reports, but some papers prepared as a result of land-classification surveys have been printed annually in bulletins entitled "Contributions to economic geology."

The list may be obtained by applying to the Director of the Survey at Washington, D. C.

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